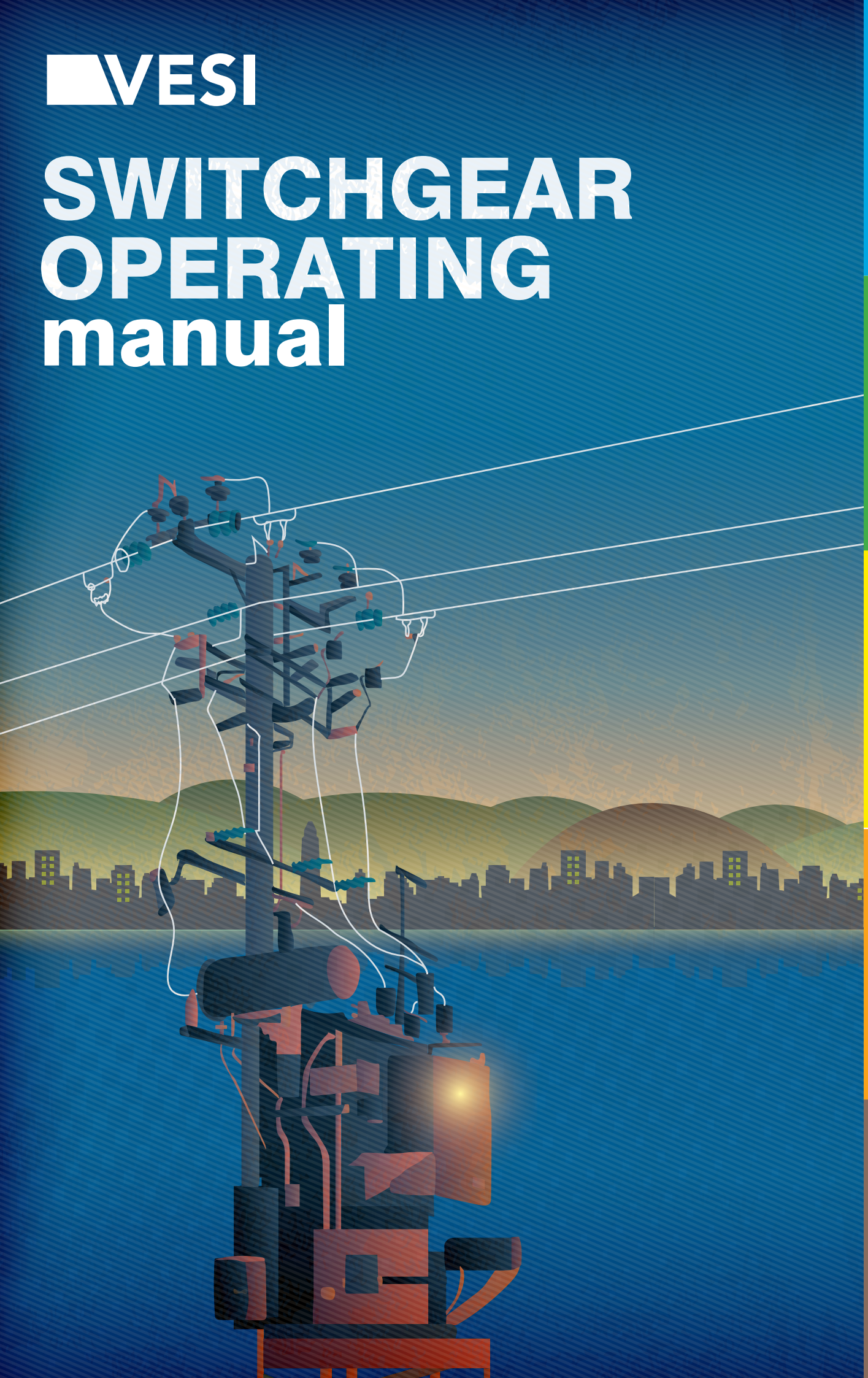
VESI

SWITCHGEAR OPERATING manual



HV INDOOR /UNDERGROUND

HV OUTDOOR

LINE REGULATORS

CONTROL BOXES

FAULT INDICATORS

SWITCHGEAR OPERATING MANUAL

FEBRUARY 2018

This High Voltage Switchgear Operating manual is an operating guide for Authorised persons working for the VESI Network Operator (AusNet Services, CitiPower, Jemena, Powercor and United Energy).

As an operating guide, it does not include all of the technical considerations, system protection requirements, and operational checks that may be required for the safe operation of the networks. In the event that a user of this manual considers the provisions do not cover, are uncertain, ambiguous or in need of interpretation, the user should seek immediate clarification from the Network Operator responsible person or their Network Control Centre.

The Manual shall be read and applied in conjunction with The Green Book (Electrical Safety Rules for the VESI Distribution Networks) and the Network Operator's HV Operations procedure manuals.

MANDATORY REQUIREMENTS

Persons operating switchgear equipment on the VESI Networks shall:

1. Be appropriately trained as a HV Operator to the VESI training requirements.
2. Be appropriately authorised by a VESI Network as a HV Operator.
3. Wear and use approved protective apparel, tools, ensuring operating equipment is in good working order and within test date.
4. Ensure the correct tagging and reporting of Defective Electrical Apparatus.
5. When access or switching is required on any VESI electrical network, for any purpose, the relevant Network Control Centre must be advised prior to the commencement and completion of any works/switching.

Feedback

For any improvements/changes/suggestions on the content of this manual, please advise your Network Operator responsible person. The use of the "Contact Us – Network Access" *www.vesi.com.au/index.php/contact-us* link on the VESI website can be utilised for suggestions, enhancements and amendments.

Updates of this manual will be published in June and December each year (if required).

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VESI SWITCHGEAR OPERATIONS RECORD OF UPDATES/CHANGES

Original document published December 2015

No.	Date	Description
1	15 March 2016	Added Cooper Single Phase CL-7 Voltage Regulator Control in Line Regulator section
2	8 August 2016	Adeed Wilson Pad Mount Kiosk Substation MK2 in HV Indoor Underground section
	1 February 2018	**NEW VERSION PUBLISHED WITH FOLLOWING UPDATES**
1	1 February 2018	Cooper Regulators CL6 Series Control Box update introductory text
2	1 February 2018	Cooper Regulators CL7 Series Control Box – add to Contents and link
3	1 February 2018	Siemens Mid Span Portable Ganged Switch – NEW
4	1 February 2018	Loadbuster – NEW
5	1 February 2018	NGK Gas Switch (Automatable) – updated
6	1 February 2018	Schneider (REFCL) Nulec ADVC3 Electronic Control Box – NEW
7	1 February 2018	Statter (ODSA) new images and revised text
8	1 February 2018	Siemens 3AD8 Fusersaver & SWER ACR – NEW
9	1 February 2018	Gevea Holec Gang Air Break Switch – new images

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WILSON PAD MOUNT KIOSK SUBSTATION MK2
WILSON SUBSTATION
WILSON SWITCH LINK
YORKSHIRE TYKE
YORKSHIRE YSF6

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200/400A CABLE CONNECTOR ELBOWS

Prior to any operation:

- Elbow cable connectors to be operated in a de-energised state only.
- Appropriate tool kit must be used during operation of elbows.
- Ensure all equipment is clean and adequately greased where necessary.
- Ensure remote end of incoming cable to be earthed is isolated.
- Conduct appropriate switching to de-energise bushings.

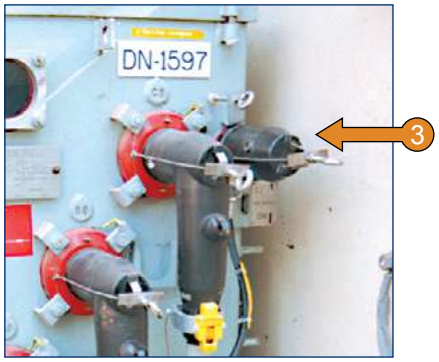
Functions:	Isolation, Earthing
Rating:	200/400 amps
Insulant:	N/A
Voltage:	22kV, 11kV, 6.6kV

Disconnection & Earthing of Cable Elbows

1 Carry out Safe to Earth test.

2 Attach earthed parking bushing tail to substation earth grid.

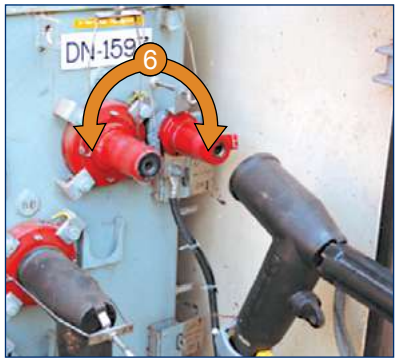
3 Place earthed parking bushing in parking bay and secure.



4 Using shot-gun stick remove dead end receptacle from earthed parking bushing.

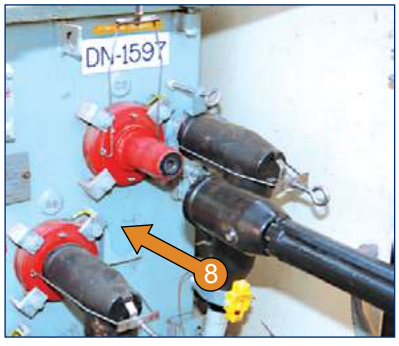
5 Loosen and remove elbow retaining bail.

6 Using a shot-gun stick remove cable elbow and transfer to exposed earthed parking bushing.



7 Re-attach elbow retaining bail to cable elbow on earthed parking bushing.

8 Using a shot-gun stick place the dead end receptacle on exposed cable elbow bushing and attach elbow retaining bail. (Do not use the dust covers).



200/400A CABLE CONNECTOR ELBOWS

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200/400A CABLE CONNECTOR ELBOWS (CONTINUED)

Re-connecting Cable Elbows

1 Remove elbow retaining bail from dead end receptacle on cable elbow bushing.

2 Using shot-gun stick remove dead end receptacle from cable elbow bushing.

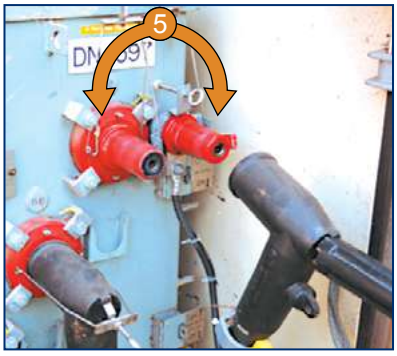
3 Test cable elbow bushing to confirm de-energised.

4 Remove elbow retaining bail from cable elbow.

5 Using shot-gun stick remove cable elbow and transfer to cable elbow bushing.

6 Re-attach elbow retaining bail.

7 Using shot-gun stick replace dead end receptacle on parking bushing and remove.



Note: *Conduct appropriate switching to de-energise bushings. Where necessary use nylon venting line and silicone grease to ensure proper attachment of cable elbow to elbow bushing.*

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600A CABLE CONNECTOR ELBOWS

Prior to any operation:

- Elbow cable connectors to be operated in a de-energised state only.
- Appropriate tool kit must be used during operation of elbows.
- Ensure all equipment is clean and adequately greased where necessary.
- Ensure remote end of incoming cable to be earthed is isolated.
- Conduct appropriate switching to de-energise bushings.

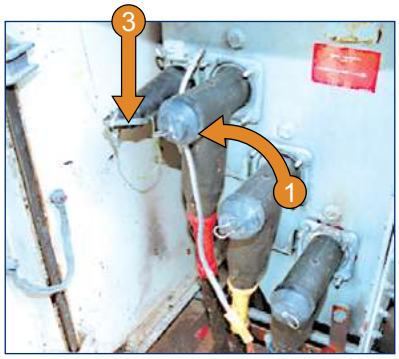
Functions: Isolation, Earthing
Rating: 600 amps
Insulant: N/A
Voltage: 22kV, 11kV

Disconnection & Earthing of Cable Elbows

1 Using shot-gun stick remove test point cap and perform Safe to Earth test.

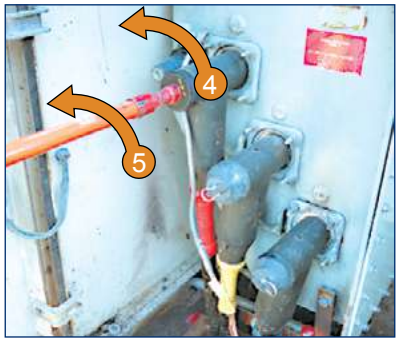
2 Attach earthed parking bushing tail to substation earth grid.

3 Place earthed parking bushing in parking bay and secure.

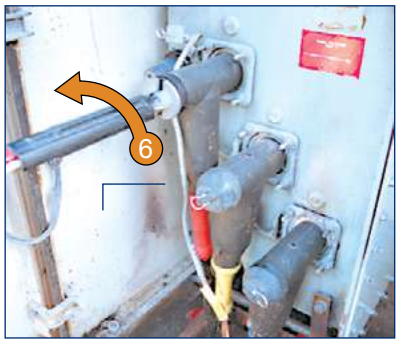


4 Using shot-gun stick unscrew and remove dead end receptacle.

5 Using torque stick rotate the elbow connector dead end plug two (2) turns **ACW**.



6 Attach the top nut socket device to the shot-gun stick and unscrew dead end plug from the cable elbow.



600A CABLE CONNECTOR ELBOWS

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600A CABLE CONNECTOR ELBOWS (CONTINUED)

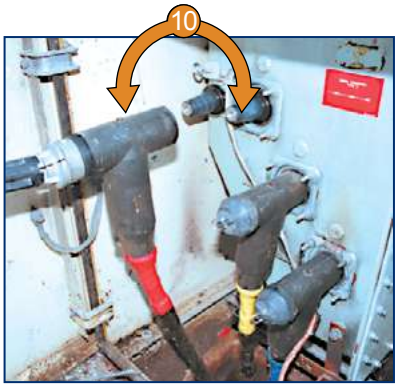
Disconnection & Earthing of Cable Elbows

7 Attach the elbow removal tool to the shot-gun stick and screw to the cable elbow.

8 Attach torque stick and tighten elbow removal tool nut **CW**.

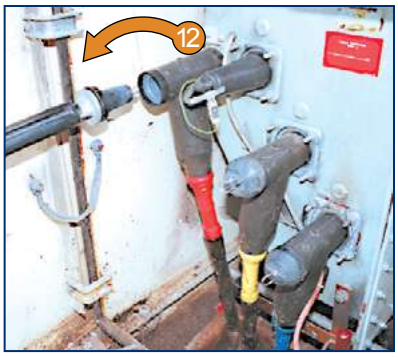
9 Attach shot-gun stick to remove cable elbow.

10 Using shot-gun stick transfer cable elbow to earthed parking bushing.



11 Attach torque stick to unscrew elbow removal tool.

12 Attach shot-gun stick to remove elbow removal tool.

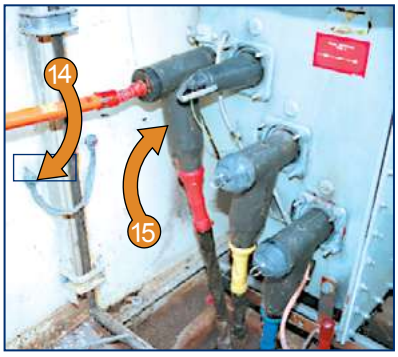


13 Attach dead end plug to shot-gun stick and insert into parked cable elbow.

14 Using torque stick tighten dead end plug.

15 Using shot-gun stick screw dead end receptacle to cable elbow bushing.

16 Attach dead end receptacle earth wire clip to earth grid.



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600A CABLE CONNECTOR ELBOWS (CONTINUED)

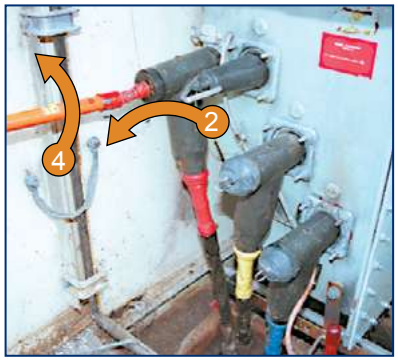
Re-connecting Cable Elbows

1 Disconnect dead end receptacle earth wire clip from earth grid.

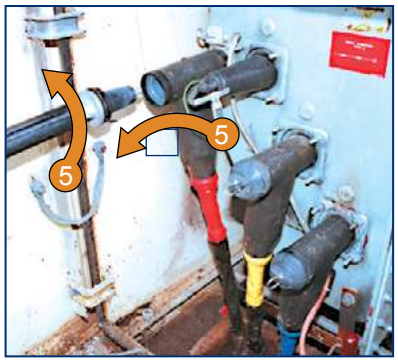
2 Using shot-gun stick unscrew dead end receptacle and remove from cable elbow bushing.

3 Using test device check cable elbow bushing is de-energised.

4 Using torque stick unscrew cable elbow dead end plug two (2) turns **ACW**.



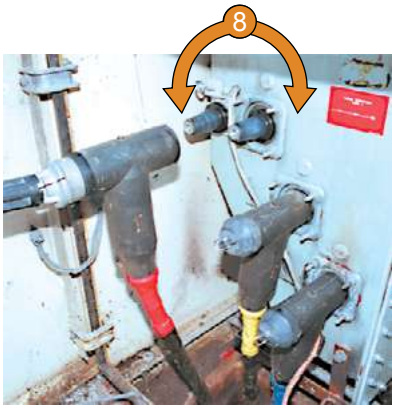
5 Attach the top nut socket device to the shot-gun stick and unscrew dead end plug from the cable elbow.



6 Attach elbow removal tool to the shot-gun stick and screw into cable elbow.

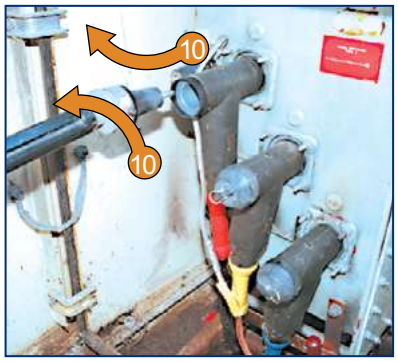
7 Using torque stick tighten the elbow removal tool attached to cable elbow.

8 Re-attach shot-gun stick to elbow removal tool and transfer cable elbow across to exposed elbow bushing.



9 Using torque stick unscrew the elbow removal tool two (2) turns **ACW**.

10 Using shot-gun stick unscrew and remove elbow removal tool from cable elbow.



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600A CABLE CONNECTOR ELBOWS (CONTINUED)

11 Attach dead end plug to shot-gun stick and insert into cable elbow.

12 Using torque stick tighten dead end nut.

13 Using shot-gun stick replace cable elbow test point cap.

14 Remove earthed parking bushing and disconnect from earth grid.

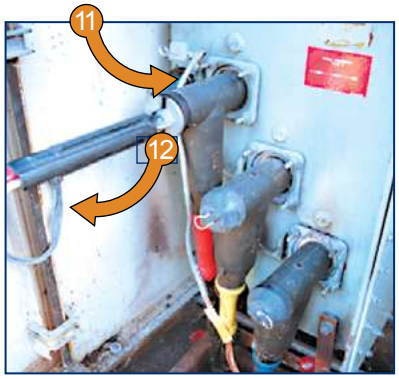

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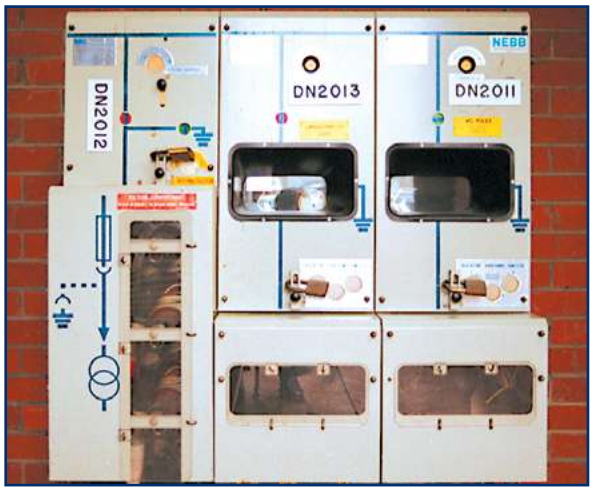
ABB / BBC TYPE RGCC

Prior to any operation:

- If equipped with a gas indication gauge check for correct pressure prior to switching
- Confirm switch location and labelling prior to operation.
- Confirm switch is in expected position; either open or close.

Functions:	Opening, Closing, Isolation, Trans Switch/CB, Earthing, HV Fuses
Rating:	630 amps
Insulant:	SF6
Voltage:	22kV



Closing HV Cable Switch

1 Insert operating handle into HV switch operating mechanism.

2 Rotate operating handle **ACW** to CLOSE HV switch.

3 Confirm semaphore agrees with switch status.

Opening HV Cable Switch

1 Insert operating handle into HV switch operating mechanism.

2 Rotate operating handle **CW** to OPEN HV switch.

3 Confirm semaphore agrees with switch status.

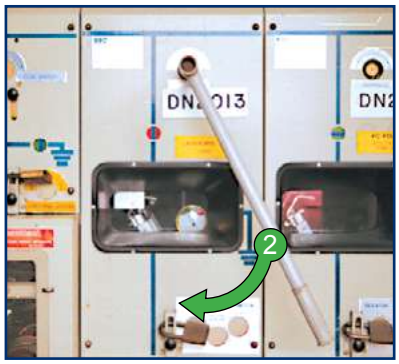


ABB / BBC TYPE RGCC

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ABB / BBC TYPE RGCC (CONTINUED)

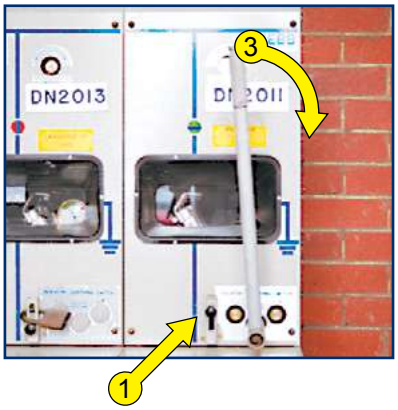
Preparation for Earthing

1 Remove padlock and raise the 'Isolate / Earth' access cover interlock.

2 Insert operating handle into centre 'Isolate / Earth' operating mechanism.

3 Rotate operating handle **CW** to prepare moving HV cable contact for earthing.

Note: *Confirm isolation via view window.*



Earthing of HV Cable

1 With the moving HV cable contacts in the isolated position carry out Safe to Earth test.

2 Insert operating handle into HV earth switch closing mechanism. (Right side)

3 Rotate operating handle **CW** to **EARTH** HV cable.

Note: *Ensure remote end of incoming cable to be earthed is isolated.*

Confirm earthing via HV switch view window.

Removal of HV Cable Earth

1 Insert operating handle into centre 'Isolate / Earth' operating mechanism.

2 Rotate operating handle **ACW** to remove HV earth from HV cable.

Note: *Confirm earth removal via view window.*

Preparing HV Cable Moving Contact for Service

1 Insert operating handle into moving contact operation mechanism. (Left side)

2 Rotate operating handle **ACW** to prepare HV cable for service.

Note: *Confirm contacts are back into service position.*

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ABB / BBC TYPE RGCC (CONTINUED)

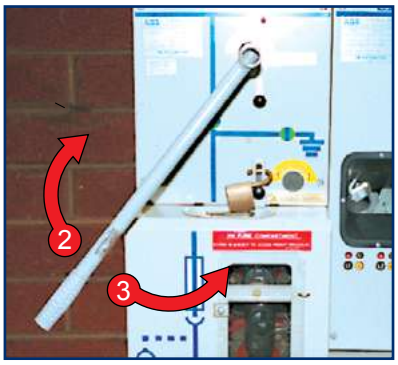
Closing HV Transformer Switch

1 Insert operating handle into transformer HV switch operating mechanism.

2 Rotate operating handle **CW** to stop position to charge operating spring.

3 Rotate operating handle **ACW** to CLOSE transformer HV switch.

4 Confirm semaphore status.

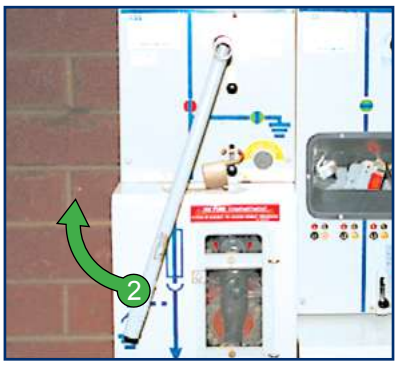


Opening HV Transformer Switch

1 Insert operating handle into transformer HV switch operating mechanism.

2 Rotate operating handle **CW** (slightly) to OPEN transformer HV switch.

3 Confirm semaphore agrees with HV switch status.



Earthing Transformer HV Cable

1 Carry out Safe to Earth test.

2 With transformer HV switch open raise the transformer earth operating mechanism interlock shutter.

3 Insert operating handle into transformer earth operating mechanism.

4 Rotate Operating handle **CW** to EARTH transformer HV cable.

5 Confirm semaphore status

Access to HV Fuses

1 With transformer HV earth switch closed pull the HV Fuse access cover release mechanism.

2 Remove HV Fuse access cover.

Note: *Access Authority required for access to HV fuses.*

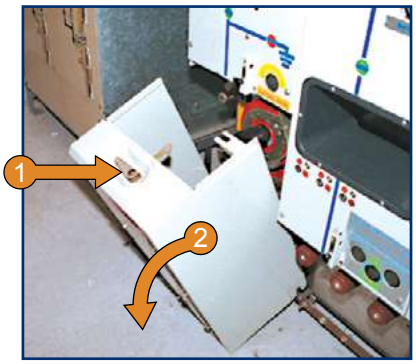


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ABB / BBC TYPE RGCC (CONTINUED)

Access to HV Fuses (continued)

3 Remove and stow HV fuse elbow cable connectors to enable access to HV fuses

Removal / Replacement of HV Fuses

1 Pull OPEN HV fuse retaining clamp and withdraw HV fuse assembly.

Note: *HV fuses may be hot.*

2 Lower HV fuse retaining clamp cover and unscrew clamp to remove HV fuse.

3 Remove HV fuse plastic guide spacer.

4 Insert new HV fuse into retaining clamp cover and ensure retaining clamp is tightened and plastic guide spacer is correctly attached.

Note: *HV fuses may be hot.*

Note: *HV fuse is to be inserted with striker pin at the opposite end to the retaining clamp cover.*

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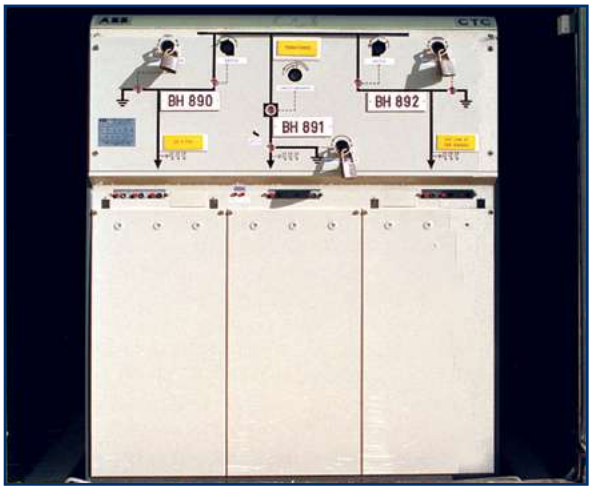
ABB CTC-V TYPE 1

Prior to operation

- Check SF6 gas pressure at leakage indicator test point using multi meter.
- CTC derivation refers to switch combination. i.e: CTC = cable, transformer, cable.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV, 6.6kV

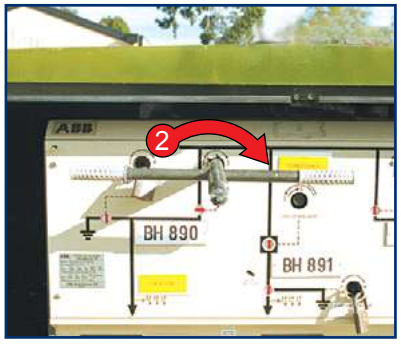


Closing HV Cable Switch

1 Insert operating handle into operating mechanism.

2 Rotate handle **CW** to CLOSE HV switch.

3 Confirm semaphore agrees with switch status

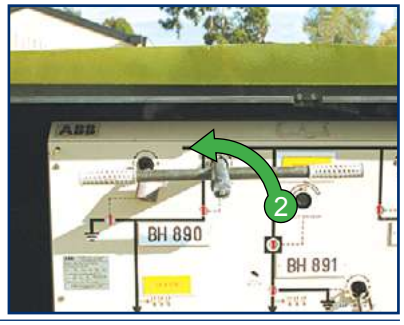


Opening HV Cable Switch

1 Insert operating handle into operating mechanism.

2 Rotate handle **ACW** to OPEN HV switch.

3 Confirm semaphore agrees with switch status.



Earthing of HV Cable

1 Ensure remote end of incoming cable to be earthed is isolated.

2 Carry out Safe to Earth test.

3 Insert operating handle into EARTH switch operating mechanism.

4 Rotate handle **CW** to CLOSE HV earth switch.

5 Confirm semaphore agrees with switch status.

Note: *To open earth switch, rotate handle ACW.*

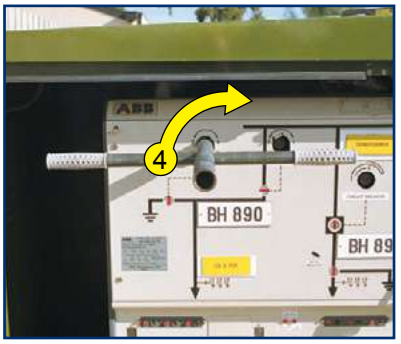


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ABB CTC-V TYPE 1 (CONTINUED)

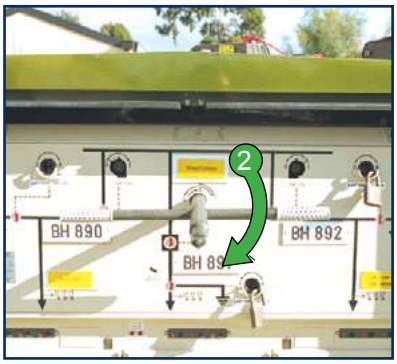
Opening Transformer CB

1 Place operating handle into transformer CB operating position.

2 Rotate operating handle **CW** to OPEN transformer CB.

3 Confirm semaphore agrees with switch status.

Note: *Once in position the operating handle need only be moved slightly to open transformer CB.*



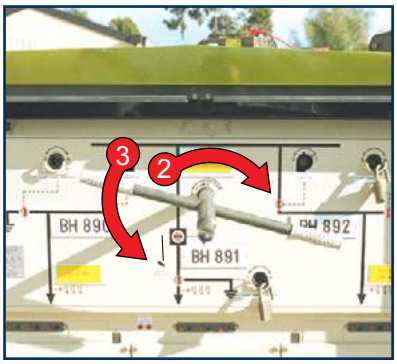
Closing Transformer CB

1 Place operating handle into transformer CB operating position.

2 Rotate operating handle **CW** to stop position to charge spring.

3 Rotate operating handle **ACW** to CLOSE transformer CB.

4 Confirm semaphore status.



Earthing of Transformer HV Cable

1 Carry out Safe to Earth test.

2 Insert operating handle into transformer earth switch operating mechanism.

3 Rotate handle **CW** to CLOSE transformer HV earth switch.

4 Confirm semaphore agrees with switch status.

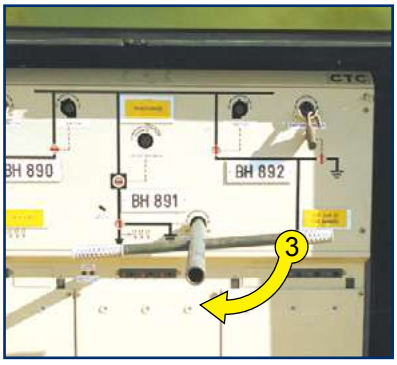


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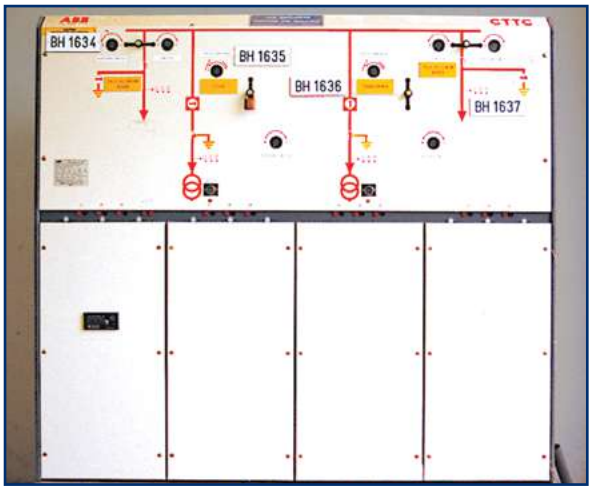
ABB CTC-V TYPE 2

Functions:	Opening, Closing, Trans Switch/ CB, Earthing
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV, 6.6kV

Prior to switching

- Check SF6 gas pressure at leakage indicator test point using multi meter.
- CTC derivation refers to switch combination. i.e: CTC = cable, transformer, cable.
- Confirm switch location and labelling prior to operation.

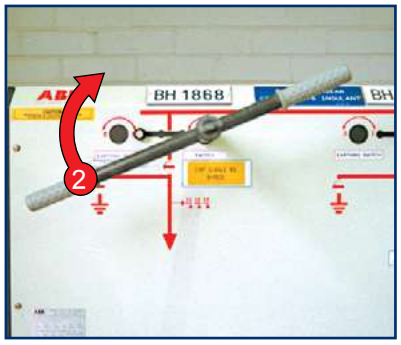


Closing HV Cable Switch

1 Slide operating mechanism interlock across and insert operating handle into operating mechanism.

2 Rotate handle **CW** to CLOSE HV switch.

3 Confirm semaphore agrees with switch status.



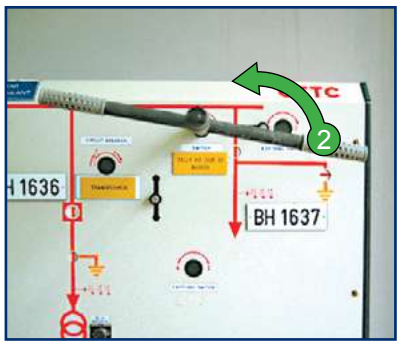
Opening HV Cable Switch

1 Slide operating mechanism interlock across and insert operating handle into operating mechanism.

2 Rotate handle **ACW** to OPEN HV switch.

3 Confirm semaphore agrees with switch status.

Note: *Ensure remote end of incoming cable to be earthed is isolated.*



Earthing of HV Cable

1 Carry out Safe to Earth test using multi meter on volts.

2 Slide operating mechanism interlock across and insert operating handle into HV earth operating mechanism.

3 Rotate handle **CW** to CLOSE HV earth switch.

4 Confirm semaphore agrees with switch status.

Note: *To open earth switch, rotate handle ACW.*

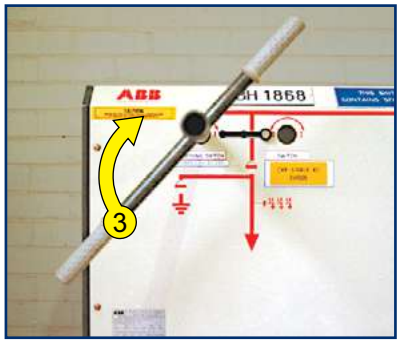


ABB CTC-V TYPE 2

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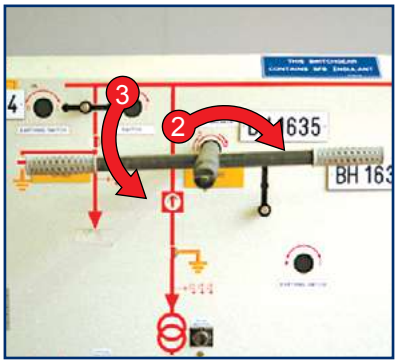
ABB CTC-V TYPE 2 (CONTINUED)

Closing Transformer CB

1 Slide operating mechanism interlock downwards and insert operating handle into transformer CB operating mechanism.

2 Rotate operating handle **CW** to stop position to charge spring.

3 Rotate operating handle **ACW** to CLOSE transformer CB. Confirm semaphore status.



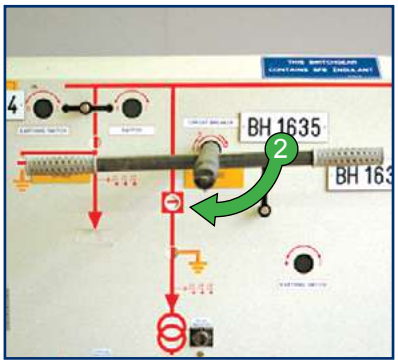
Opening Transformer CB

1 Slide operating mechanism interlock downwards and insert operating handle into transformer CB operating mechanism.

2 Rotate operating handle **CW** to OPEN transformer CB.

3 Confirm semaphore agrees with switch status.

Note: *Once in position the operating handle need only be moved slightly to open transformer CB.*



Earthing of Transformer HV Cable

1 Carry out Safe to Earth test.

2 Slide operating mechanism interlock upwards and insert operating handle into transformer earth operating mechanism.

3 Rotate handle **CW** to CLOSE transformer HV earth switch.

4 Confirm semaphore status.

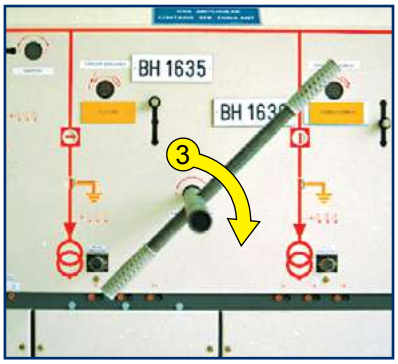


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ABB UNISWITCH

Functions: Opening, Closing
Rating: 630 Amps
Insulant: SF6
Voltage: 11kV

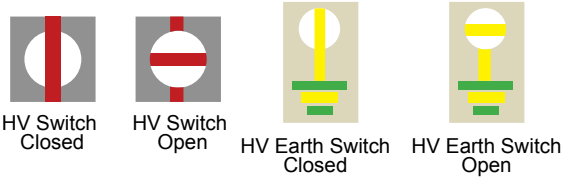
Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- This HV switch is also used in conjunction with the ABB SACE HAR CB.

Refer to the **ABB UniSwitch SACE HAR CB** instruction page in this manual for further details.

- There is no 'Safe to Earth' test facility on these HV switches.
- Confirm the switch location and labelling prior to operating.
- Access Authority required to access HV fuses.

Semaphores



HV Switch Closed | HV Switch Open | HV Earth Switch Closed | HV Earth Switch Open

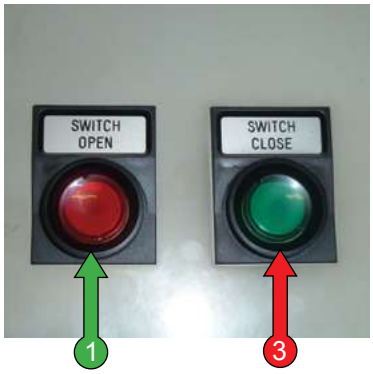
Opening / Closing the HV Switch – Local Electrical

1 Press the **red** 'SWITCH OPEN' button to OPEN the HV switch.

2 Confirm the semaphore shows

3 Press the **green** 'SWITCH CLOSE' button to CLOSE the HV switch.

4 Confirm the semaphore shows.



Closing the HV Switch - Manually

1 Slide the operating mechanism interlock cover to the left and insert the operating handle into the operating mechanism.

2 Rotate the operating handle **CW** to the stop position to CLOSE the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows.

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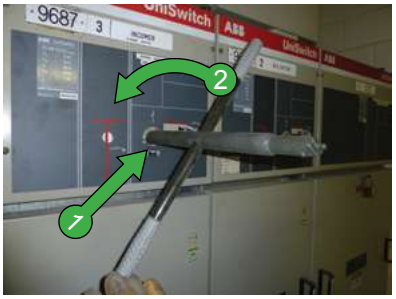
ABB UNISWITCH (CONTINUED)

Opening the HV Switch – Manually

1 Slide the operating mechanism interlock cover to the left and insert the operating handle into the operating mechanism.

2 Rotate the operating handle **ACW** to the stop position to OPEN the HV switch.

3 Remove the operating handle.



Closing the HV Earth Switch

1 Confirm the relevant HV switch is open.

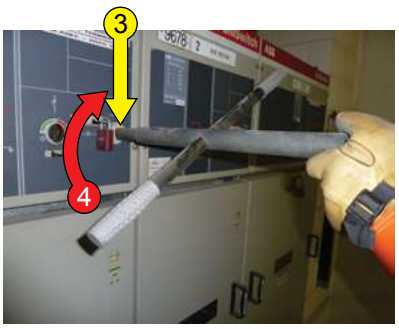
2 Unlock and remove the HV earth switch interlock padlock.

3 Slide the HV earth switch interlock to the left and insert the operating handle into the HV earth switch operating mechanism as shown.

4 Rotate the operating handle **CW** to the stop position to CLOSE the HV earth switch.

5 Remove the operating handle.

6 Confirm the semaphore shows.



Note: *There is no 'Safe to Earth' test facility on these HV switches. Ensure the remote end of the HV cable / transformer to be earthed is isolated.*

Opening the HV Earth Switch

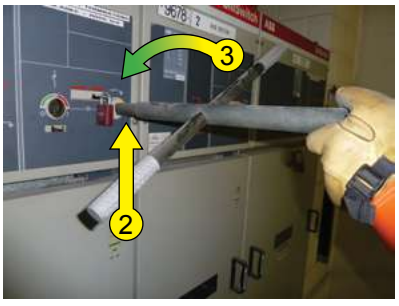
1 If required, unlock and remove the HV earth switch interlock padlock.

2 Slide the HV earth switch interlock to the left and insert the operating handle into the HV earth switch operating mechanism as shown.

3 Rotate the operating handle **ACW** to the stop position to OPEN the HV earth switch.

4 Remove the operating handle.

5 Confirm the semaphore shows.



Note: *Once in position the operating handle need only be moved slightly to open transformer CB.*

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ABB UNISWITCH (CONTINUED)

Access to the HV Fuses

1 Confirm the relevant HV earth switch is closed.

2 Grasp the two (2) HV fuse cubicle access cover handles and lift upwards then outwards to remove the access cover.

3 Replace the HV fuses as required.

Note: *HV fuses may be hot.*

The HV fuse striker pins must be located on the top of the HV fuse.

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ABB UNISWITCH SACE HAR CB

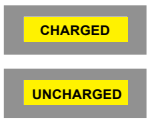
Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Remote operation of this CB is always the preferred method.
- This CB can operate in conjunction with the ABB UniSwitch. Refer to the **ABB UniSwitch** instructions in this manual if required.
- The CB must be opened and locked before the HV switch can be opened.
- Confirm the CB location and labelling prior to operating.

Semaphores

CB Closed

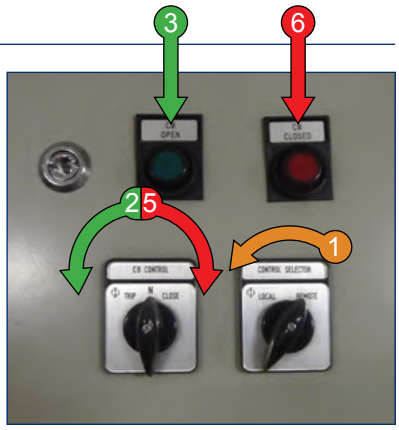
CB Open



Operating Spring Status

Functions:	Remote Electrical Open, Local Electrical Open, Push Button Open/Close, Padlock & Tag
Rating:	630 Amps
Insulant:	SF6
Voltage:	11kV

Opening / Closing the HV Switch – Local Electrical



1 Rotate the 'CONTROL SELECTOR' switch to the 'LOCAL' position.

2 Rotate the 'CB CONTROL' switch **ACW** to the 'TRIP' position to **OPEN** the CB.

3 Confirm the **green** 'CB OPEN' indicating light illuminates.

4 Confirm the semaphore shows.

5 Rotate the 'CB CONTROL 'switch **CW** to the 'CLOSE' position to **CLOSE** the CB.

6 Confirm the **red** 'CB CLOSED' indicating light illuminates.

7 Confirm the semaphore shows

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ABB UNISWITCH SACE HAR CB (CONTINUED)

Opening / Closing the HV Switch - Manually

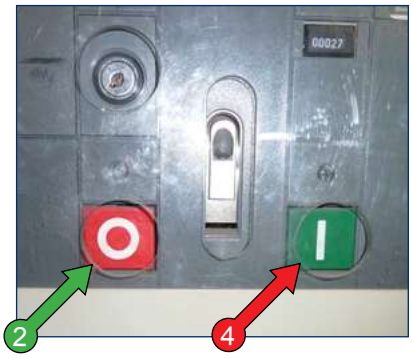
1 Rotate the 'CONTROL SELECTOR' switch to the 'LOCAL' position.

2 Push the **red** 'O' button to OPEN the CB.

3 Confirm the semaphore shows

4 Push the **green** 'I' button to CLOSE the CB.

5 Confirm the semaphore shows

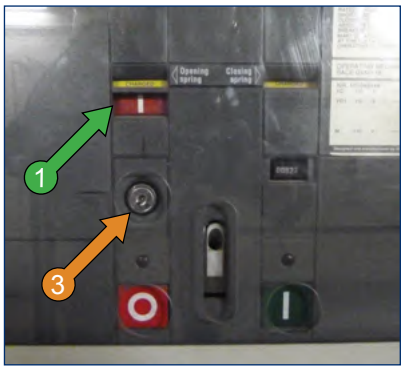


Locking the CB in the Open Position.

1 Confirm the CB is open.

2 Confirm the 'CONTROL SELECTOR' switch is in the 'LOCAL' position.

3 Insert the interlock key and rotate 90 degrees **CW** to lock open the CB.



Charging the CB Operating Spring

1 Insert the CB spring charge handle into the spring charge mechanism as shown.

2 Lower the spring charge handle to the stop position to charge the operating spring.

3 Remove the spring charge handle.

4 Confirm the relevant (open- close) operating spring semaphore shows

Note: *The operating spring needs to be charged for both opening and closing the CB.*

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AEI OW5 & FP BR4

Prior to any operation:

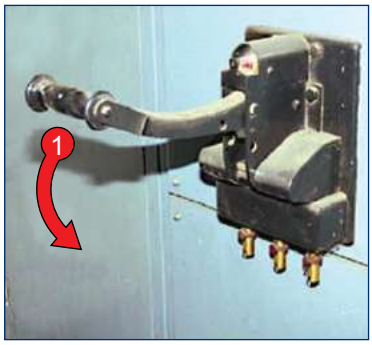
- Confirm the switch is fit for service prior to and after any operation.
- These switches can be isolated by an adjacent set of HV isolators.
- This switchgear is NOT spring assisted. Operation must be a rapid, firm and continuous motion.

Functions: Manual Open, Close
Rating: 300amps
Insulant: Oil
Voltage: 6.6kV

Closing the HV Switch

1 Lower the operating handle **in a rapid, firm and continuous motion** to the stop position to CLOSE the HV switch.

2 Confirm the semaphore agrees with the HV switch status.

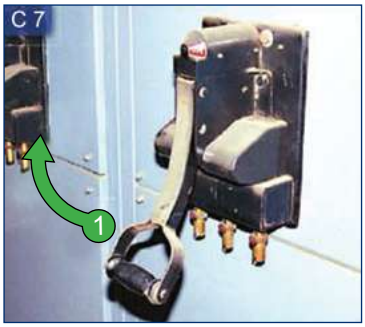


Opening the HV Switch

1 Raise the operating handle to the stop position to OPEN the HV switch.

2 Confirm the semaphore agrees with the HV switch status.

3 To lower the operating handle, lift the centre of the hinged latch situated below the operating handle.



AEI OW5 & FP BR4

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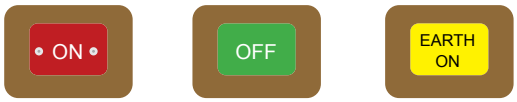
ANDELECT TYPE SDAF-SDP

Prior to any operation:

- Confirm the HV switch oil is correct.
- HV switches may come in configurations of 2, 3 and 4 units. Main picture inserts 'A' and 'B' show some variations however operating principles remain the same for all configurations.
- When a 'high pot' test is to be carried out on any HV cable attached to this switchgear the entire unit must be included on the access authority.
- Confirm the switch location and labelling prior to operating.

Semaphores



Functions: Opening, Closing
Rating: 630 Amps
Insulant: Oil
Voltage: 11kV

Closing the HV Cable Switch

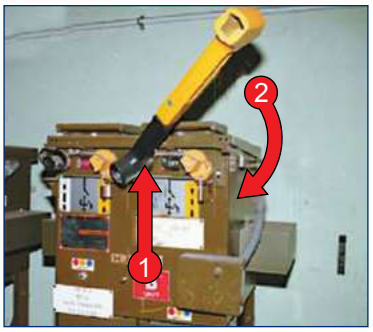
1 Place the black end of operating handle onto the operating mechanism.

2 Rotate the operating handle **CW** to the stop position to CLOSE the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows

.



Opening the HV Cable Switch

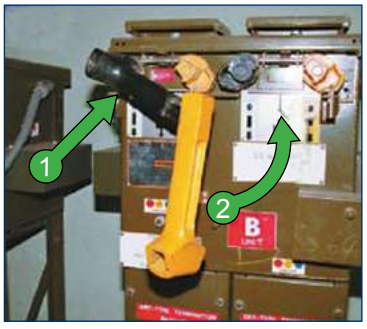
1 Place the black end of operating handle onto the operating mechanism.

2 Rotate the operating handle **ACW** to the stop position to OPEN the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows

.



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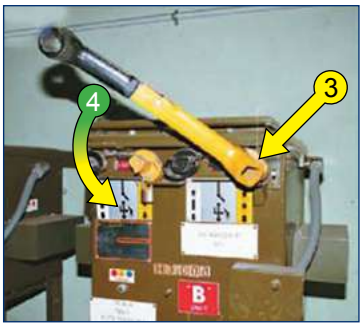
ANDELECT TYPE SDAF-SDP (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm the relevant HV switch is open.

2 Remove the padlock from the HV earth switch operating mechanism.

3 Place the yellow end of the operating handle onto the HV earth switch operating mechanism.

4 Rotate the operating handle **ACW** to the stop position to CLOSE the HV earth switch.

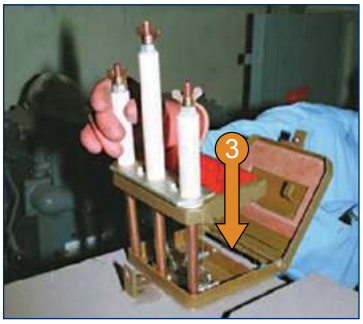
5 Remove the operating handle.

6 Confirm the semaphore shows EARTH ON

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

Note: *To open HV earth switch, rotate operating handle clockwise.*

Attaching the Test Probes



1 Confirm the relevant HV earth switch is closed.

2 Unscrew the retaining bolt and raise the test probe access cover shown.

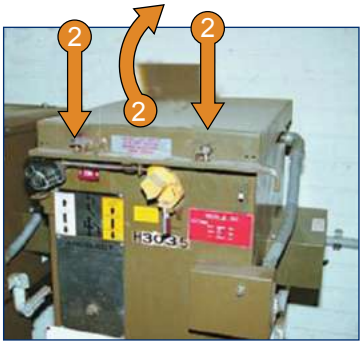
3 Insert the probe assembly and push firmly into position.

4 Attach the test equipment

5 OPEN the relevant HV earth switch and perform the required test.

Note: *On the completion of tests re-close the HV earth switch to enable removal of the test probe assembly.*

Access to the HV Fuses



1 Confirm the relevant transformer HV earth switch is closed.

2 Unscrew the two (2) retaining bolts and raise the HV fuse access cover to gain access to the HV fuses.

Note: *HV fuses may be hot.*

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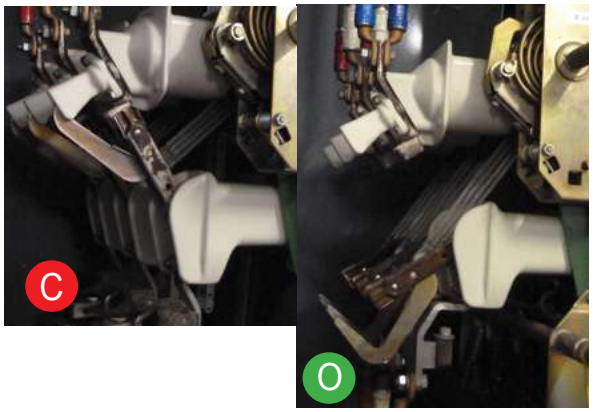
BBC TYPE NAL A MEC

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Note: Operating instructions are for HV switches that are mounted on the right hand side of cubicle / wall. If the HV switch is mounted on the left side then all operating instructions are reversed. These HV switches can be installed in cubicle and kiosk type substations.
- Confirm the switch location and labelling prior to operating.
- Warning: Only a slight amount of operating handle movement will open the HV switch – simply attaching the operating handle may open the HV switch!
- After switching, visually confirm the HV switch has operated correctly.
- Confirm the earth switch location and labelling prior to operating.

Functions: Opening, Closing, Earthing
Rating: 400 amps
Insulant: Air
Voltage: 11kV, 6.6kV



Note: *Correct identification of the A-Mec version of this switchgear can either be made by the label or by using the spring type, which is a flat coil design for the A-Mec.*

Closing the HV Switch

1 Unlock and remove the operating mechanism interlock.

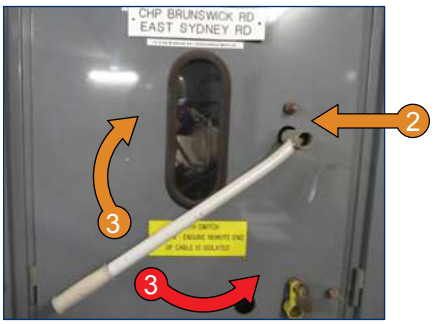
2 Place the operating handle onto the operating mechanism.

3 Rotate the operating handle **CW** to the stop position to charge the operating spring then **ACW** to the stop position to CLOSE the HV switch.

4 Remove the operating handle.

5 Replace the operating mechanism interlock.

6 Visually confirm the HV switch has closed correctly.



Note: *If the operating handle does not move CW to charge the spring, then the spring has been previously charged for closing of the earth switch.*

Opening the HV Switch

1 Unlock and remove the operating mechanism interlock.

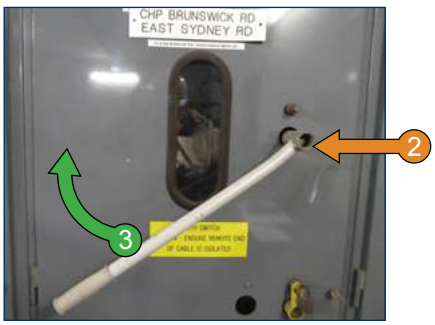
2 Place the operating handle onto the operating mechanism.

3 Rotate the operating handle **CW** to OPEN the HV switch.

4 Remove the operating handle.

5 Replace the operating mechanism interlock.

6 Visually confirm the HV switch has opened correctly.



BBC TYPE NAL A MEC

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BBC TYPE NAL A MEC (CONTINUED)

Closing the HV Earth Switch

1 Confirm the HV switch is open.

2 Unlock and remove the operating mechanism Interlock.

3 Place the operating handle onto the operating mechanism.

4 Rotate the HV switch operating handle **CW** to the stop position to charge the operating spring. **DO NOT rotate the operating handle ACW at this point.**

5 Unlock and remove the HV earth switch interlock.

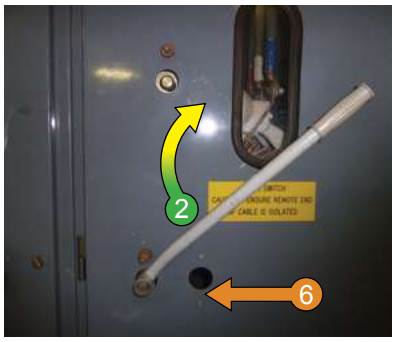
6 Transfer 1he operating handle from the HV switch operating mechanism to HV earth switch operating mechanism as shown.

7 Rotate the earth switch operating handle **CW** to the stop position to CLOSE the HV earth switch.

8 Remove the operating handle.

9 Visually confirm the HV earth switch has closed correctly.

Note: *Ensure the remote end of incoming cable to be earthed is isolated.*



Opening the HV Earth Switch

1 Unlock and remove the HV earth switch operating mechanism interlock.

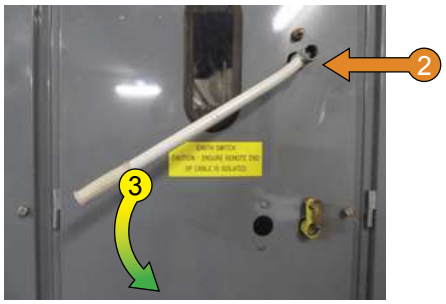
2 Place the operating handle onto the HV earth switch operating mechanism.

3 Rotate the operating handle **ACW** to OPEN the HV earth switch.

4 Remove the operating handle.

5 Replace the HV earth switch operating mechanism interlock.

6 Visually confirm the HV earth switch has opened correctly.



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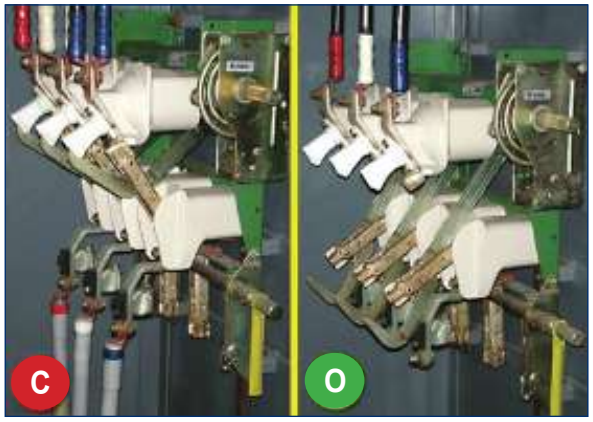
BBC TYPE NAL K MEC

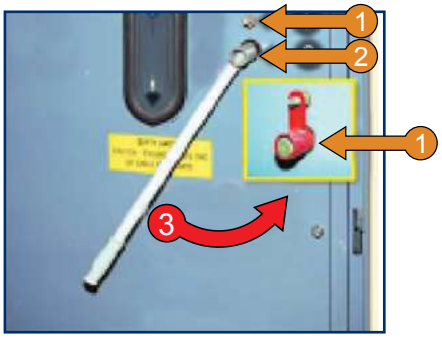
Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Note: Operating instructions are for HV switches that are mounted on the right hand side of cubicle / wall. If the HV switch is mounted on the left side then all operating instructions are reversed.
- These HV switches can be installed in cubicle and kiosk type substations.
- After switching visually confirm the HV switch has operated correctly.
- Confirm the HV switch location and labelling prior to operating.

Functions: Opening, Closing, Earthing
Rating: 400 amps
Insulant: Air
Voltage: 11kV, 6.6kV

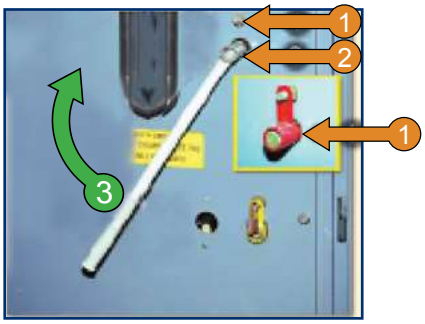


Closing the HV Switch



1 Unlock and remove the operating mechanism interlock.
2 Place the operating handle onto the operating mechanism.
3 Rotate the operating handle **ACW** to the stop position to CLOSE the HV switch.
4 Remove the operating handle.
5 Replace the operating mechanism Interlock.
6 Visually confirm the HV switch has closed correctly.

Opening the HV Switch



1 Unlock and remove the operating mechanism interlock.
2 Place the operating handle onto the operating mechanism.
3 Rotate the operating handle **CW** to open the HV switch then **ACW** slightly until tension is felt. **This action releases the earth switch interlock.**
4 Remove the operating handle.
5 Replace the operating mechanism interlock.
6 Visually confirm the HV switch has opened correctly.

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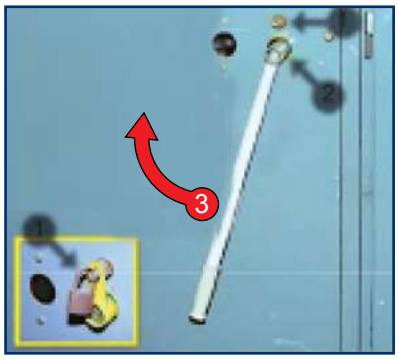
BBC TYPE NAL K MEC (CONTINUED)

Closing the HV Earth Switch



1 Unlock and remove the earth switch operating mechanism interlock.

2 Place the operating handle onto the earth switch operating mechanism as shown.

3 Rotate the operating handle **CW** to CLOSE the HV earth switch.

4 Remove the operating handle.

5 Replace the earth switch operating mechanism interlock.

6 Visually confirm the HV earth switch has closed correctly.

Note: *If the earth switch will not move, rotate the HV switch open / close shaft ACW until tension is felt. Refer to point 3 –'Opening the HV Switch' – see previously.*

Note: *To open HV earth switch, rotate handle anti-clockwise.*

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BRUSH FALCON

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the SF6 gas level is correct via the pressure gauge prior to any operation.
- Confirm the switch location and labelling prior to operation.

ON	HV Switch Closed	EARTH ON	HV Earth Switch Closed
OFF	HV Switch Open	EARTH OFF	HV Earth Switch Open
SPRING FUSES	Trans HV Switch operating spring discharged	SPRING CHARGED	Trans HV Switch operating spring charged

Functions: Opening, Closing, Earthing
Rating: 630 amps
Insulant: SF6
Voltage: 11kV

Closing the HV Cable Switch

1 Place the operating handle onto the operating mechanism.

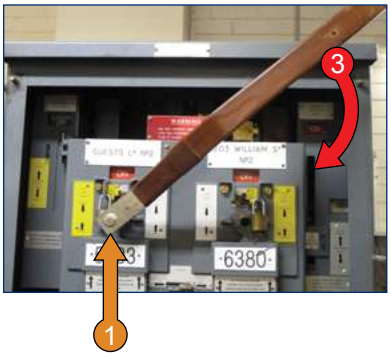
2 Press the 'Feeder' switch tab interlock to allow closing of the HV switch.

3 Rotate the operating handle in the direction indicated to the stop position to CLOSE the HV switch.

4 Remove the operating handle.

5 Restore the 'Feeder' switch tab interlock to normal.

6 Confirm the semaphore shows ON.



Note: *The direction of operation to close the HV Cable switch depends on the location on the switchgear. eg. Left side – rotate the handle CW. Right side – rotate the handle ACW.*

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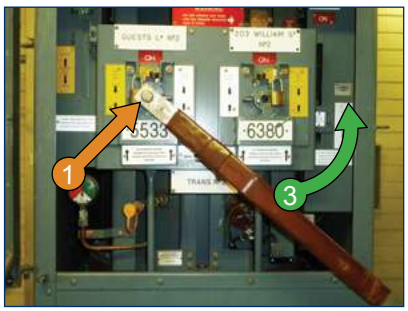
BRUSH FALCON (CONTINUED)

Opening the HV Cable Switch



1 Place the operating handle onto the operating mechanism.

2 Press the 'Feeder switch tab interlock to allow opening of the HV switch.

3 Rotate the operating handle **ACW** to the stop position to OPEN the HV switch.

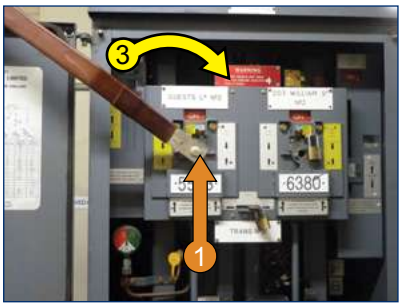
4 Remove the operating handle.

5 Restore the 'Feeder' switch tab Interlock to normal.

6 Confirm the semaphore shows OFF.

Note: *The direction of operation to open the HV Cable switch depends on the location on the switchgear. eg. Left side – rotate the handle ACW. Right side – rotate the handle CW.*

Closing the HV Cable Earth Switch



1 Remove the earthing padlock and place the operating handle into the operating mechanism.

2 Press the 'Earth' switch tab Interlock (yellow) to allow the closing of the HV earth switch.

3 Rotate the operating handle **CW** to the stop position to CLOSE the HV earth switch.

4 Remove the operating handle.

5 Restore the 'Earth' switch tab interlock to normal.

6 Confirm the semaphore shows EARTH ON.

Note: *The direction of operation to close the HV Cable earth switch depends on the location on the switchgear. eg. Left side – rotate the handle CW. Right side – rotate the handle ACW.*

Note: *To open HV cable earth switch, rotate handle in anti-clockwise direction.*

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BRUSH FALCON (CONTINUED)

Access to the Test Probes

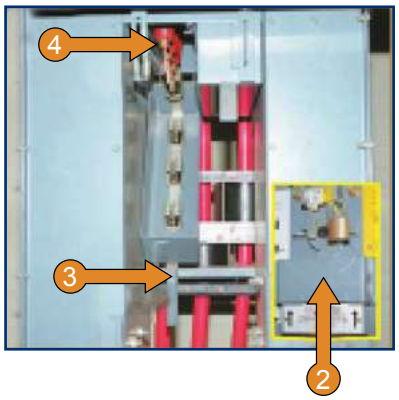
1 Confirm the relevant HV earth switch is closed.

2 Raise the access cover interlock (see insert)

3 Grab the test probe access cover handle and lower the access cover as shown.

4 Attach the test equipment to the probes and perform the test as required.

5 On completion of testing ensure the access cover is firmly closed to allow the access cover interlock to be restored to normal.



Closing the Transformer HV Switch

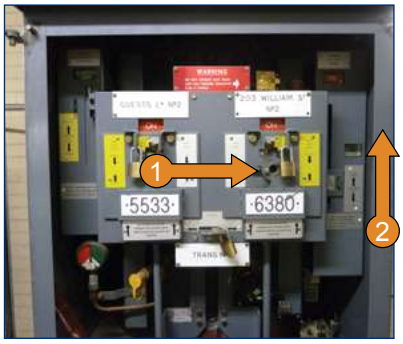
1 Place the operating handle into the transformer HV switch operating mechanism.

2 Raise the operating handle to the stop position to charge the closing spring. Confirm the semaphore shows SPRING CHARGED

3 Lower the operating handle to the stop position to CLOSE the transformer HV switch.

4 Remove the operating handle.

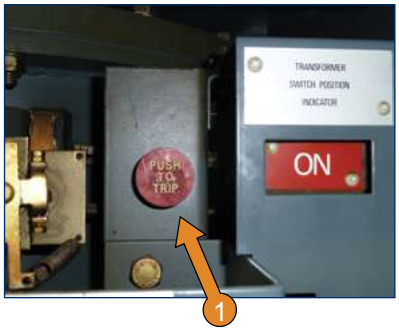
5 Confirm the semaphore shows ON.



Opening the Transformer HV Switch

1 Press the 'Push to Trip' button to OPEN the transformer HV switch.

2 Confirm that the semaphore shows OFF.



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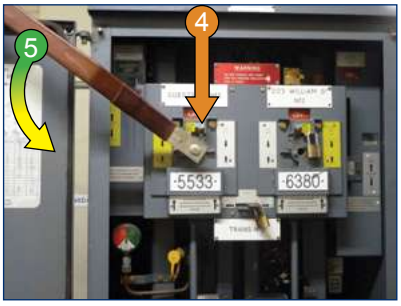
BRUSH FALCON (CONTINUED)

Closing the Transformer HV Cable Earth Switch



1 Confirm the relevant transformer HV switch is open.

2 Remove the padlock and open the earth interlock flap.

3 Move the transformer interlock to the 'Transformer Earth Switch Free' position.

4 Place the operating handle into the transformer HV earth switch operating mechanism.

5 Rotate the operating handle **ACW** to the stop positon to CLOSE the transformer HV earth switch.

6 Remove the operating handle.

7 Confirm semaphore agrees shows EARTH ON.

Note: *If required perform a 'Safe to Earth' test at the transformer connections.*

Note: *To open transformer HV cable earth switch, rotate handle in clockwise direction.*

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BRUSH TYPE 2 CB

Prior to any operation

- Confirm the CB is fit for service prior to and after any operation.

Note: *the main picture insert shows the Brush Q2D CB. Operation is as per the Brush R4 / R8 CB.*

- Remote operation of these CBs is always the preferred method.
- Confirm the CB location and labelling prior to operating.

CB Closed

CB Open

Functions:	Opening, Closing, Earth Truck
Rating:	400A (R4), 800A (R8), 2000A (Q2D)
Insulant:	Oil
Voltage:	11kV

Closing / Opening the CB – Remotely

1 Close / Open CB using the substation remote operating facility. If require refer to one of the following manual templates for further instruction:

- MCC CB Control Panel
- PMCC CB Remote Control
- CB Remote Control – Sub R, J, NS, PR, RP, LS
- Substation Mimic Control Panel.

Opening the CB – Manually

1 Open the CB access door.

2 Rotate the 'ACCESS TO TRIP PUSH BUTTON' flap.

3 Push the **red** trip button to open the CB.

4 Confirm the semaphores shows

.

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BRUSH TYPE 2 CB (CONTINUED)

Racking Out the CB

1 Confirm the CB is open.

2 Open from 'LOCKED' to the 'FREE' position.

3 Insert the racking handle into the racking mechanism as shown.

4 Rotate the racking handle **ACW** and lower the CB until the indicator on the right side of the CB points to the 'ISOLATED position.

5 Remove the racking handle and shift the carriage interlock from the 'LOCKED' to the 'FREE' position.

6 Withdraw the CB from cubicle.

Locking the Shutters

1 Place locks on shutters as required.

Note: *Ensure the correct identification of shutters prior to locking.*

Racking in the CB

1 Confirm the CB is open.

2 Push the CB into the cubicle.

3 Shift the carriage interlock lever to the 'LOCKED' position.

4 Insert the racking handle into the racking mechanism.

5 Rotate the racking handle **CW** to raise the CB until the indicator on the right side of CB points to the 'ENGAGED' position.

6 Withdraw the racking handle and rotate the isolating mechanism interlock lever **ACW** to the 'LOCKED' position.

7 Close the CB cubicle access door.

Notes:

Ensure the locks have been removed from the shutters prior to racking in the CB.

Ensure the CB is racked into the correct position (possibility of more than one circuit in the CB cubicle).

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BRUSH TYPE 2 CB (CONTINUED)

Earthing the Bus / HV Cable

1 Ensure the earth truck is set up for proper spout alignment using the stop lever on top left side of the earth truck.

2 If required unlock the shutters.

3 Connect the earth lead to the earth grid cone.

4 Push the truck into position in the CB cubicle.

5 Raise the earth truck probes by lowering the yellow handle.

6 Perform a ‘Safe to Earth’ test.

7 Discharge and attach earths to the probe cones.

Note: *Ensure that the correct shutters are unlocked prior to insertion of the earth truck.*

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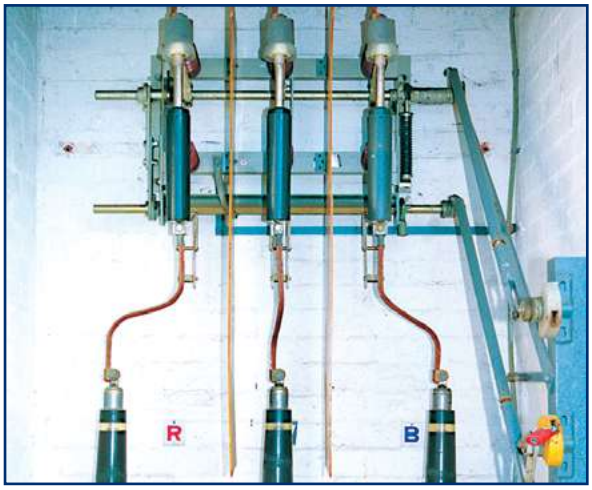
CALOR EMAG

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	630 amps
Insulant:	Air
Voltage:	22 kV

Prior to any operation:

- This switchgear must be operated with cubicle doors closed if fitted.
- Check HV switch is fit for service prior to and after operation.
- Some Calor Emag operating mechanisms may vary in design. This may result in a reversal of the following operating instructions. Confirm the mechanism type prior to operating the HV switch.
- Confirm switch location and labelling prior to operation.
- Access Authority required to access HV fuses.

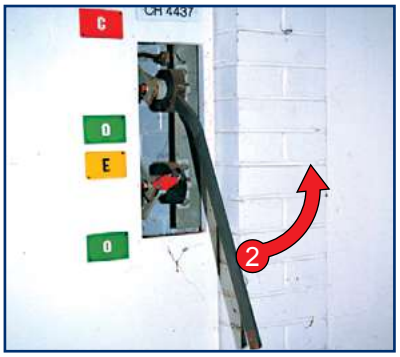


Closing HV Cable Switch

1 Insert operating handle into open/close operating mechanism.

2 Raise operating handle to **CLOSE** HV switch.

3 Visually confirm all three (3) phases of the HV switch have closed/penetrated corerctly.

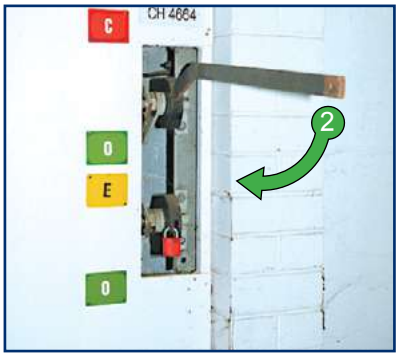


Opening HV Cable Switch

1 Insert operating handle into open/close operating mechanism.

2 Lower operating handle to **OPEN** HV switch.

3 Visually confirm all three (3) phases of the HV switch have opened correctly.



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CALOR EMAG (CONTINUED)

Earthing of HV Cable

1 Perform Safe to Earth test.

2 Insert operating handle into earth switch operating mechanism.

3 Raise operating handle to **EARTH** HV cable.

Note: *Ensure remote end of incoming cable to be earthed is isolated.*

Close /Open/Earth Transformer HV Switch

Operations as per HV cable switch as previous.

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ENGLISH ELECTRIC CV CB

Prior to any operation:

- Confirm HV CB is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing, Racking, Trans Switch/CB, Earthing
Rating:	400 amps
Insulant:	Oil
Voltage:	11kV

Closing HV CB

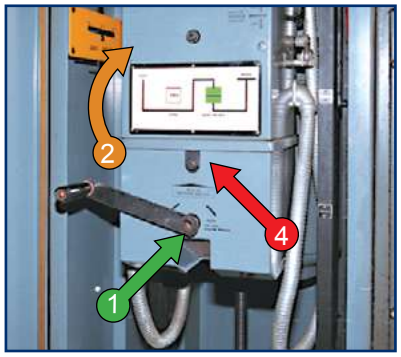
1 OPEN CB door and insert CB spring charge handle into spring charge mechanism.

2 Rotate spring charge handle **CW** to stop position to charge CB closing spring.

3 Confirm spring 'Charged' semaphore.

4 Press 'Close' button to CLOSE CB.

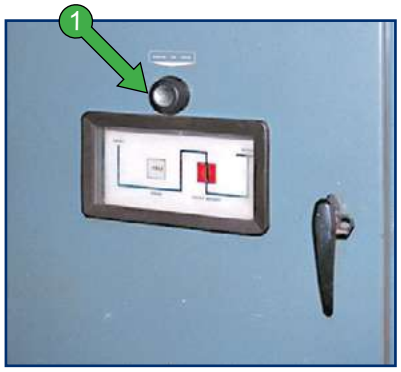
5 Confirm semaphore status.



Opening HV CB

1 Press CB Trip button.

2 Confirm semaphore agrees with switch status.



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ENGLISH ELECTRIC CV CB (CONTINUED)

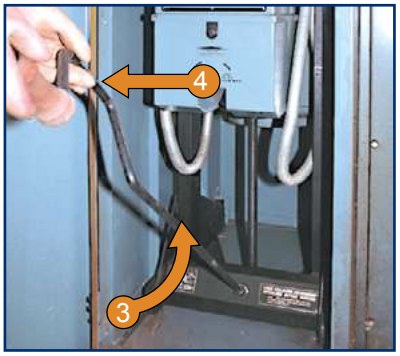
Racking Out CB

1 Confirm CB is open and shift CB interlock from ‘Lock’ to ‘Free’ position.

2 Insert racking handle into CB racking mechanism.

3 Rotate racking handle **ACW** until CB racking indicator points to ‘Isolated’ position.

4 Withdraw CB from CB cubicle.

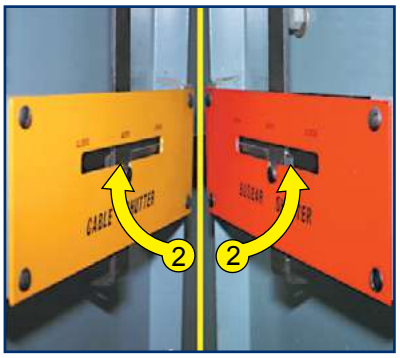


Locking Shutters

1 Identify shutters to be locked.

2 Move shutter control lever to ‘Closed’ position.

3 Lock control lever with padlock.



Racking In CB

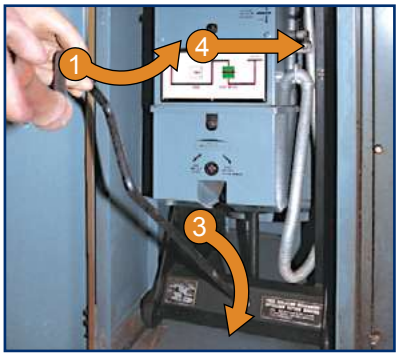
1 Place CB into CB cubicle after unlocking shutters. Ensure shutter locks are removed prior to racking in HV CB.

2 Insert racking handle into CB racking mechanism.

3 Rotate racking handle **CW** until CB racking indicator points to ‘Service’ position.

4 Shift CB interlock from ‘Free’ to ‘Lock’ position.

Note: *Ensure CB is open prior to racking.*



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ENGLISH ELECTRIC OLX – MANUAL

Prior to any operation:

- Confirm the HV CB is fit for service prior to and after operation.
- Confirm CB location and labelling prior to operation.

Functions:	Opening, Closing, Racking, Trans Switch/CB, Earthing
Rating:	400 amps
Insulant:	Oil
Voltage:	11kV

Closing CB

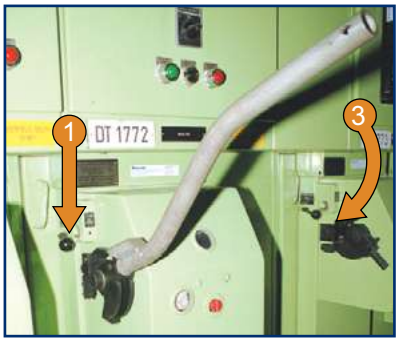
1 Check interlock lever is in locked position.

2 Place spring charge handle on spring charge mechanism.

3 Push handle down two (2) times to charge spring. Semaphore indicates 'Charged'.

4 Pull operating trigger to **CLOSE** CB.

5 Confirm semaphore / indicating lights.



Opening CB

1 Press electrical trip button.

2 Confirm semaphore / indicating light agrees with switch status.

Racking Out CB

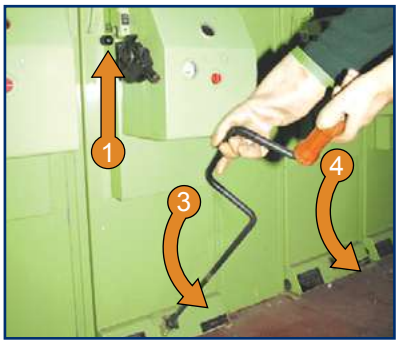
Note: *Ensure CB is open prior to racking.*

1 Shift interlock lever to 'Free' position.

2 Place racking handle in position.

3 Rotate handle **ACW** until CB indicator points to 'Lowered position'.

4 Remove CB from CB cubicle.



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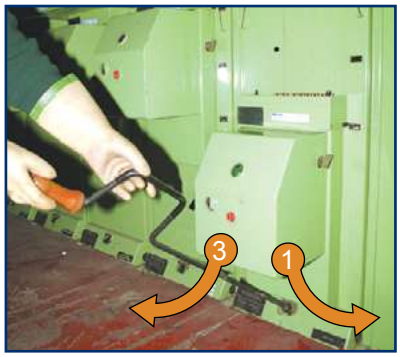
ENGLISH ELECTRIC OLX – MANUAL (CONTINUED)

Racking in CB

Note: *Ensure CB is open prior to restoration.*
Ensure bus and cable shutter locks have been removed prior to racking in the HV CB.



1 Place CB into service position.

2 Place racking winding handle into position.

3 Turn racking handle **CW** until CB indicator points to 'Raised' position.

4 Shift interlock lever to 'Locked' position.

Locking Shutters

1 Insert padlocks through either / both cable or bus bar shutters as required.

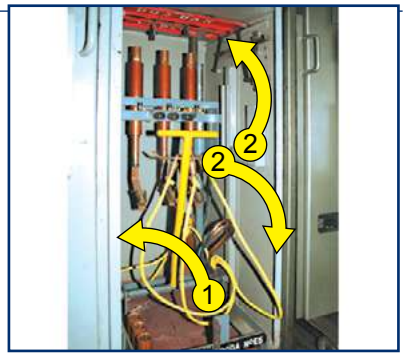
Earthing of HV Cable / Bus Bar

1 Connect earth truck earth lead to earth grid and place earth truck in either cable or bus bar earth position in CB cubicle.

2 Raise earth truck connections by pushing down handle.

3 Carry out Safe to Earth test.

4 Attach Earths.



Note: *Ensure remote end of incoming cable to be earthed is isolated.*
Ensure correct earth probe contacts are correct size.

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ENGLISH ELECTRIC TYPE C15

Prior to any operation:

- Operation Semaphores can be found on both the front and rear of HV switch unit.
- Confirm switch location and labelling prior to operation

Functions:	Opening, Closing, Earthing
Rating:	400 amps
Insulant:	Oil
Voltage:	11 kV

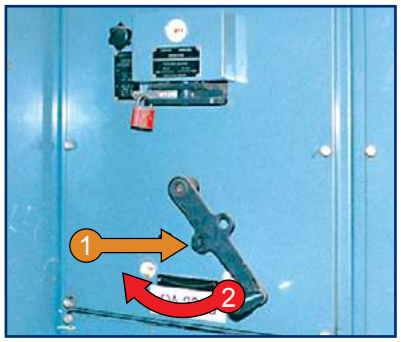
Closing HV Cable Switch

1 Push in operating handle interlock pin.

2 Rotate operating handle **CW** to CLOSE HV switch.

3 Restore the operating handle interlock pin to the 'safety' position.

4 Confirm semaphore agrees with switch status.



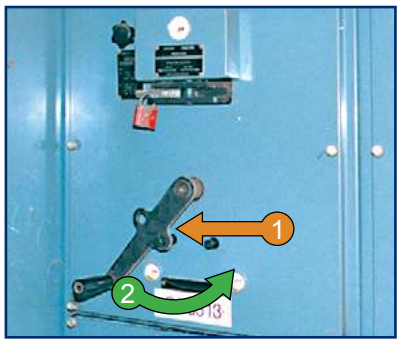
Opening HV Cable Switch

1 Push in operating handle interlock pin.

2 Rotate operating handle **ACW** to OPEN HV switch.

3 Restore the operating handle interlock pin to the 'safety' position.

4 Confirm semaphore agrees with switch status.



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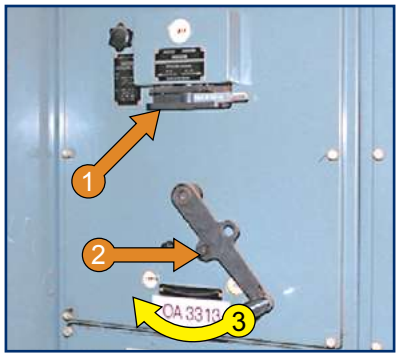
ENGLISH ELECTRIC TYPE C15 (CONTINUED)

Earthing of HV Cable



1 With HV switch in the open position move the operation selection lever from 'Off/On' position to 'Earth' position.

2 Push in operating handle interlock pin.

3 Rotate operating handle **CW** to **CLOSE** HV earth switch.

4 Restore the operating handle interlock pin to the 'safety' position.

5 Confirm semaphore status.

Note: *If unable to carry out Safe to Earth test at HV switch unit do so at remote end of HV cable to be earthed.*

Note: *To open HV cable earth switch, rotate handle in anti-clockwise direction.*

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ETEL KIOSK SUBSTATION

Prior to any operation:

- The operating mechanism can function in both directions - **CW**, **ACW**. Ensure the limiting plate interlock is in the correct position prior to operating.
- Check the oil level prior to switching and/or removal of the HV bayonet fuses.
- Ensure the transformer tank pressure is equalised by the bleed valve (0,3) prior to removal of the HV bayonet fuses.
- Refer to the WILSON KIOSK SUBSTATION template in this manual for instructions on the removal/ replacement of the HV bayonet fuses.
- Confirm the HV switch location and labelling prior to operation.

Functions: Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Insulant: Oil
Voltage: 22kV

Closing the HV Cable Switch

Confirm whether the HV switch status indicator (shown in red), is pointing to the:

1 'OFF' 9 o'clock position or:

2 'OFF' 3 o'clock position.

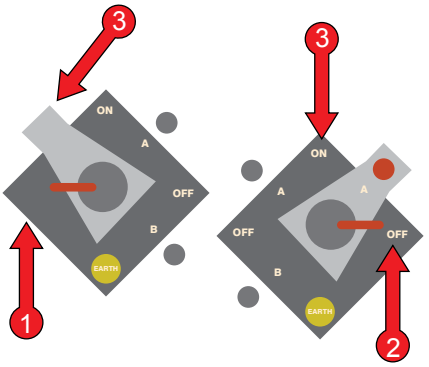
3 Set/confirm the limiting plate interlock is locked in the corresponding position 'A' as shown in the diagrams.

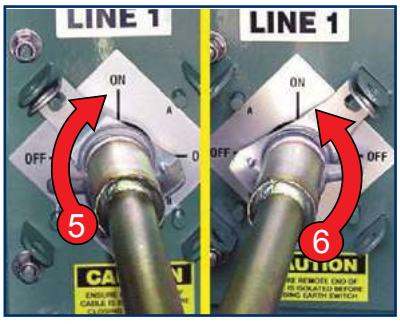
4 Attach the operating handle to the operating mechanism.

5 If the indicator points to 'OFF' at 9 o'clock rotate the operating handle **CW** to the stop position to **CLOSE** the HV switch. Remove the handle.

6 If the indicator points to 'OFF' at 3 o'clock rotate the operating handle **ACW** to the stop position to **CLOSE** the HV switch. Remove the handle.

7 Confirm the indicator is to the 'ON' position.





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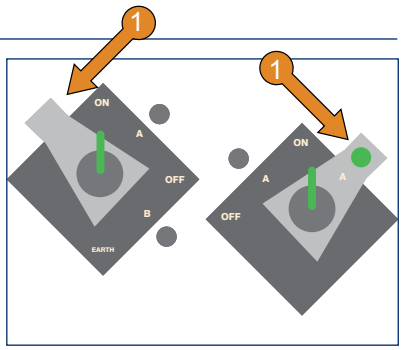
ETEL KIOSK SUBSTATION (CONTINUED)

Opening the HV Cable Switch

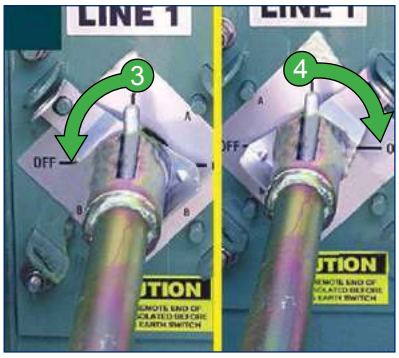


1 Confirm the HV switch status indicator (shown in green) is pointing to the 'ON' position and the limiting plate interlock is in either position 'A' as shown.

2 Attach the operating handle to the operating mechanism.

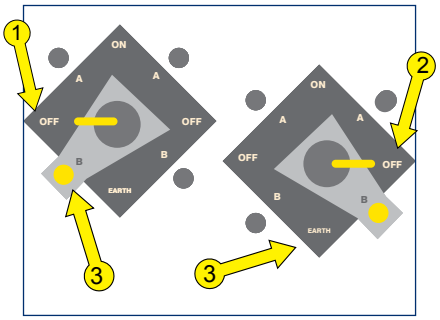
3 If the limiting plate interlock is on 'A left' rotate the operating handle **ACW** to the stop position to **OPEN** the HV switch. Remove the handle.

4 If the limiting plate interlock is on 'A right' rotate the operating handle **CW** to the stop position to **OPEN** the HV switch. Remove the handle. Confirm the indicator is to the 'OFF' position.



Closing the HV Cable Earth Switch

Confirm whether the HV switch status indicator (shown in yellow) is pointing to the:



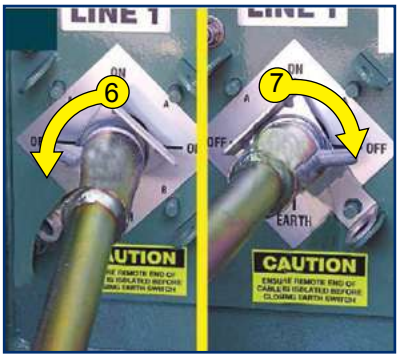
1 'OFF' 9 o'clock position or:

2 'OFF' 3 o'clock position.

3 Unlock, rotate, set and relock, if required, the limiting plate interlock in the corresponding position 'B' as shown in the diagrams.

4 Press the green 'PUSH TO TEST' button to confirm the 'Safe to Earth' LED indicating lights are functioning correctly.

5 Attach the operating handle to the operating mechanism.



6 If the indicator points to 'OFF' at 9 o'clock, rotate the operating handle **ACW** to the stop position to **CLOSE** the earth switch. Remove the handle.

7 If the indicator points to 'OFF' at 3 o'clock, rotate the operating handle **CW** to the stop position to **CLOSE** the earth switch. Remove the handle.

8 Confirm the indicator points to the 'EARTH' position.

Note: *Confirm the remote end of the HV cable is isolated prior to earthing.*

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ETEL KIOSK SUBSTATION (CONTINUED)

Opening the HV Cable Earth Switch

1 Confirm the HV switch status indicator (shown in yellow) is pointing to the 'EARTH' position and the limiting plate interlock is in either position 'B' as shown.

2 Attach the operating handle to the operating mechanism.

3 If the limiting plate interlock is on 'B left' rotate the operating handle **CW** app.135 degrees to the stop position to OPEN the earth switch. Remove the handle.

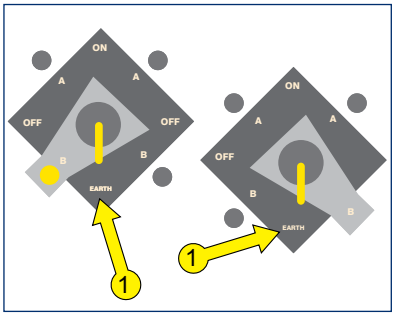
4 If the limiting plate interlock is on 'B right' rotate the operating handle **ACW** app. to the stop position to OPEN the earth switch. Remove the handle. Confirm the indicator points to the 'OFF' position.

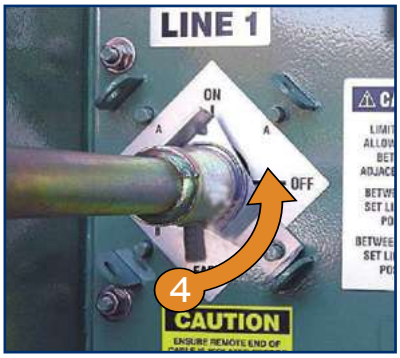
5 Confirm whether the HV switch status indicator - shown in orange - is pointing to the:

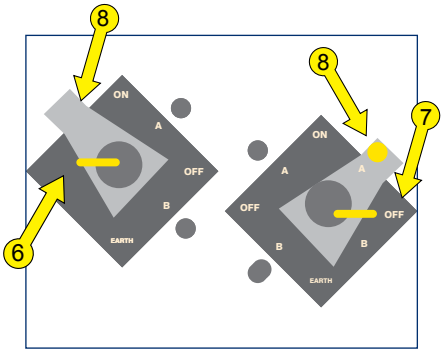
6 'OFF' 9 o'clock position or:

7 'OFF' 3 o'clock position.

8 Rotate, set and lock, if required, the limiting plate interlock in the corresponding position 'A' as shown in the diagrams.







Removal/Replacement of the HV Bayonet Fuses

Refer to the: WILSON KIOSK SUBSTATION section in this manual for detailed instructions on the removal and replacement of the HV bayonet fuses as used with this switchgear.

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Prior to any operation:

- If equipped with a gas indication gauge check for correct pressure prior to switching.
- Confirm switch location and labelling prior to operation.
- Access Authority required to access HV fuses.

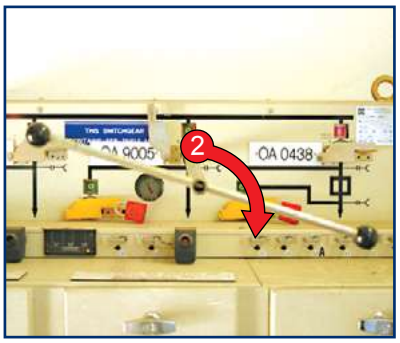
Functions: Opening, Closing, Earthing
Rating: 630 amps
Insulant: SF6
Voltage: 11 kV, 22 kV

Closing HV Cable Switch

1 Insert operating handle into HV switch operating mechanism.

2 Rotate operating handle **CW** to **CLOSE** HV switch.

3 Confirm semaphore agrees with switch status.

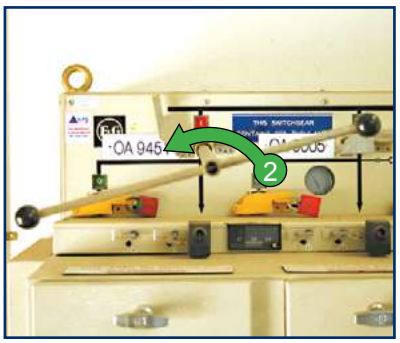


Opening HV Cable Switch

1 Insert operating handle into HV switch operating mechanism.

2 Rotate operating handle **ACW** to **OPEN** HV switch.

3 Confirm semaphore agrees with switch status.



Earthing of HV Cable

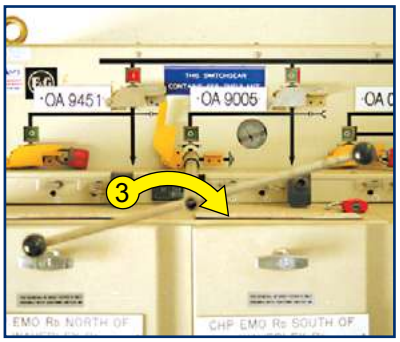
1 Carry out Safe to Earth test.

2 Insert operating handle into HV earth switch operating mechanism.

3 Rotate operating handle **CW** to **CLOSE** HV earth switch.

4 Confirm semaphore agrees

Note: *To open HV cable earth switch, rotate handle in anti-clockwise direction.*



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F&G (FELTEN & GUILLEAUME) (CONTINUED)

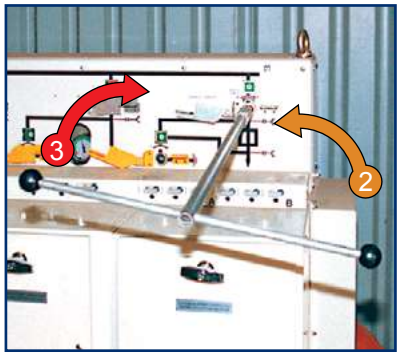
Closing Transformer HV Switch

1 Raise access flap and insert operating handle into transformer HV switch operating mechanism.

2 Rotate operating handle **ACW** to stop position to charge operating spring.

3 Rotate operating handle **CW** to stop position to **CLOSE** transformer HV switch.

4 Confirm semaphores agree with transformer HV switch status.

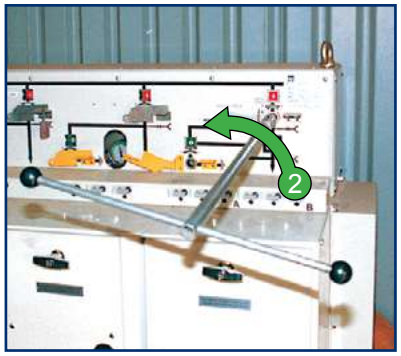


Opening Transformer HV Switch

1 Raise access flap and insert operating handle into transformer HV switch operating mechanism.

2 Rotate operating handle **ACW** to stop position to **OPEN** transformer HV switch.

3 Confirm semaphores agree with transformer HV switch status.



Earthing of Transformer

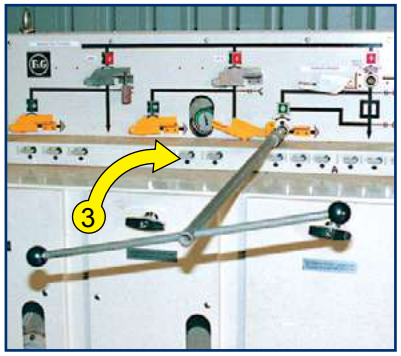
1 Carry out Safe to Earth Test.

2 Raise access flap and insert operating handle into transformer HV earth switch operating mechanism.

3 Rotate operating handle **CW** to stop position to **CLOSE** transformer HV earth switch

4 Confirm semaphores agree with HV earth switch status.

Note: *To open transformer HV earth switch, rotate handle in anti-clockwise direction.*



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F&G (FELTEN & GUILLEAUME) (CONTINUED)

Access to HV Fuses

1 With transformer HV earth switch closed rotate handle on HV fuse access cover panel and pull panel forwards to access HV fuses.

Removal/Replacement of HV Fuses

1 Raise HV fuse retaining bale.

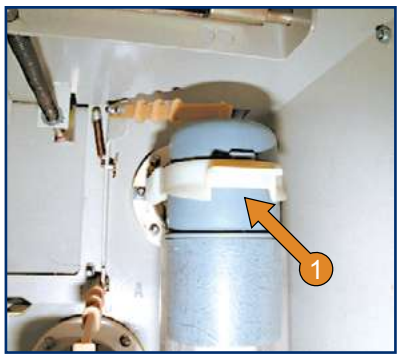
2 Using HV fuse assembly extraction tool withdraw top HV fuse assembly from switchgear.

3 Remove HV fuse assembly from lower section.

4 Remove HV fuse outer protective cover.

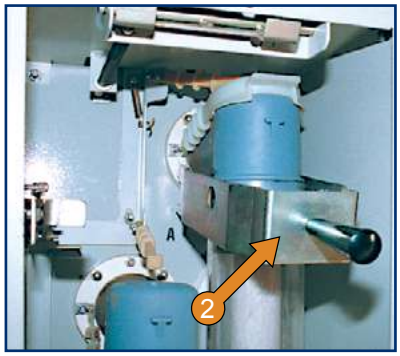
5 Remove HV fuse from top HV fuse assembly section.

6 Replace HV fuse as required.



Note: *When replacing HV fuse ensure striker pin is at the top of the HV fuse assembly.*

Warning: *HV fuses may be hot.*



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F & G (FELTEN & GUILLEAUME) GA

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- If equipped with an SF6 gas indication gauge confirm for correct pressure prior to switching.
- The triangle key in the cable cover doors MUST be rotated fully clockwise to enable insertion of the operating handle and closing of the HV switch.
- Access Authority required to access HV fuses.

Note: *Front cable cover door interlocks block the insertion of the operating handle into the open/close operating mechanism.*

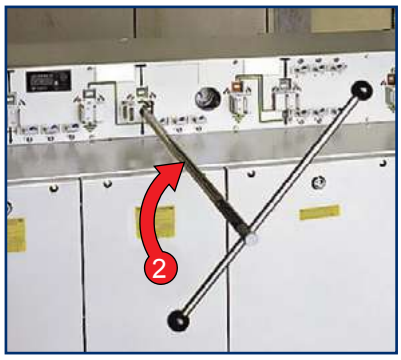
Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	630 Amps
Insulant:	SF6
Voltage:	22kV, 11kV, 6.6kV
Voltage:	22kV, 11kV

Closing the HV Cable Switch

1 Open the access cover and insert the operating handle into the HV switch open/close operating mechanism.

2 Push the operating handle inwards and rotate **CW** to the stop position to CLOSE the HV switch.

3 Confirm the semaphore agrees with the HV switch status.



Opening the HV Cable Switch

1 Open the access cover and insert the operating handle into the HV switch open/close operating mechanism.

2 Push the operating handle inwards and rotate **ACW** to the stop position to OPEN the HV switch.

3 Confirm the semaphore agrees with the HV switch status.

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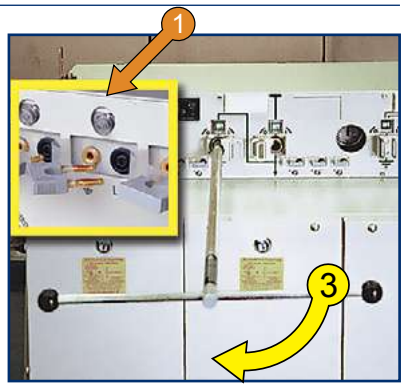
Earthing the HV Cable

1 Perform a 'Safe To Earth' test. Remove the bridge connector as shown to activate the test neon indicator.

2 Open the access cover and insert the operating handle into the HV earth switch open/close operating mechanism.

3 Push the operating handle inwards and rotate **CW** to the stop position to **CLOSE** HV earth switch.

4 Confirm the semaphore agrees with HV earth switch status.



Note: *To open HV cable earth switch, rotate handle in clockwise direction.*

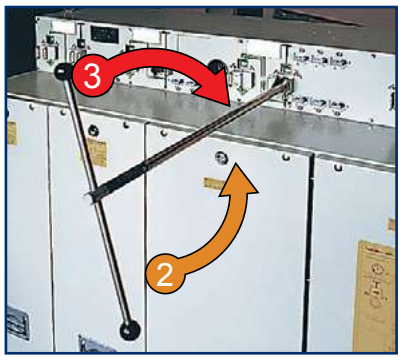
Closing the Transformer HV Switch

1 Open the access cover and insert the operating handle into the transformer HV switch open/close operating mechanism.

2 Rotate the operating handle **ACW** to the stop position to charge the operating spring.

3 Rotate the operating handle **CW** to the stop position to **CLOSE** the transformer HV switch.

4 Confirm the semaphore agrees with the transformer HV switch status.

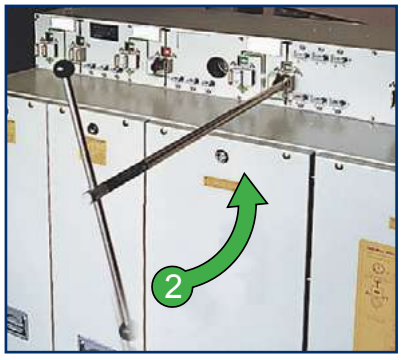


Opening the Transformer HV switch

1 Open the access cover and insert the operating handle into the transformer HV switch open/close operating mechanism.

2 Rotate the operating handle **ACW** to the stop position to **OPEN** the transformer HV switch.

3 Confirm the semaphore agrees with the transformer HV switch status.



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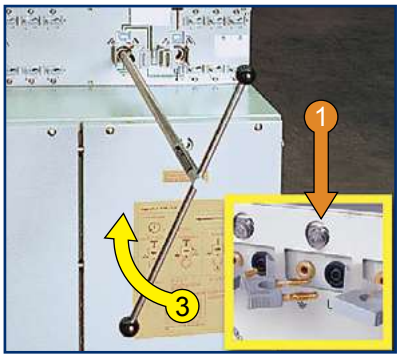
F & G (FELTEN & GUILLEAUME) GA (CONTINUED)

Earthing the Transformer HV Cable



1 Perform a 'Safe To Earth' test. Remove the bridge connector as shown to activate the test neon indicator.

2 Open the access cover and insert the operating handle into the transformer HV earth switch open/close operating mechanism.

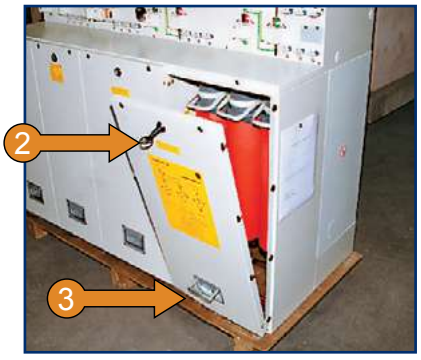
3 Rotate the operating handle **CW** to the stop position to CLOSE the transformer HV earth switch.

4 Confirm the semaphore agrees with the transformer HV earth switch status.

Note: *Confirm the transformer main LV isolators are open prior to closing the HV earth switch.*

Note: *To open transformer HV cable earth switch, rotate handle in anti-clockwise direction.*

Access to the HV Fuses

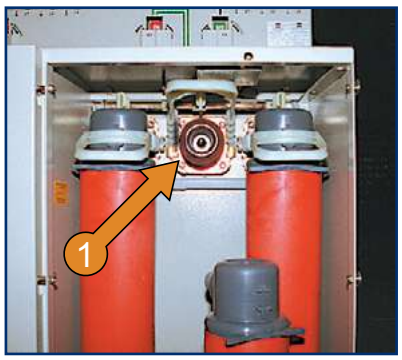


1 Confirm the transformer HV earth switch is closed.

2 Insert the HV fuse access cover key and rotate **ACW** to unlock the access cover.

3 Using access cover handle lift and remove the HV fuse access cover.

Removal / Replacement of the HV Fuses



1 Raise the HV fuse retaining bail

2 Withdraw the HV fuse top mounting assembly.

3 Remove the HV fuse from the lower mounting assembly.

4 Replace the HV fuse.

5 Clean and lubricate all contact fittings prior to restoration of the HV fuse mounting assemblies. The lubricant is located on the inside of the HV fuse access panel.

Note: *HV fuses may be hot. Ensure the HV fuse striker pin is located at the top of the mounting assembly.*

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Prior to any operation:

- Ensure the switchgear is fit for service prior to and after operation.
- Confirm correct SF6 gas pressure via the gas pressure gauge prior to and after operation.
- Confirm the HV cable switch location and labelling prior to operation.
- Aceess Authority is required to access HV fuses.

Functions:	Opening, Closing, Trans Switch CB, Earthing, HV Fuses
Rating:	630 amps
Insulant:	SF6
Voltage:	11 kV, 22 kV

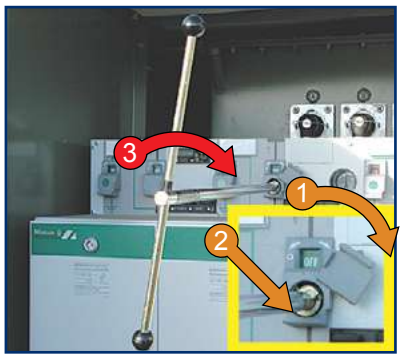
Closing the HV Cable Switch

1 Rotate the HV cable switch open / close operating mechanism access flap.

2 Insert the operating handle into the open / close operating mechanism.

3 Push in and rotate the operating handle **CW** to the stop position to **CLOSE** the HV cable switch.

4 Confirm the semaphore agrees with the HV cable switch status.



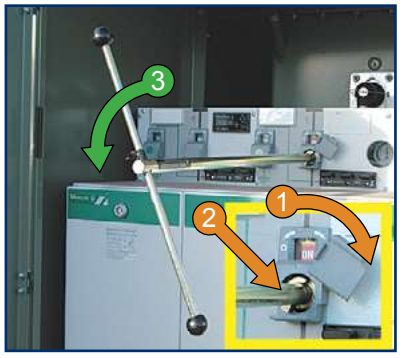
Opening the HV Cable Switch

1 Rotate the HV cable switch open / close operating mechanism access flap.

2 Insert the operating handle into the open / close operating mechanism.

3 Push in and rotate the operating handle **ACW** to the stop position to **OPEN** the HV cable switch.

4 Confirm the semaphore agrees with the HV cable switch status.



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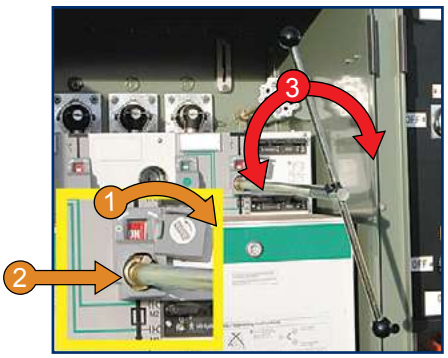
F&G (FELTEN & GUILLEAUME) GA2K (CONTINUED)

Closing the Transformer HV Switch



1 Rotate the transformer HV switch open / close operating mechanism access flap.

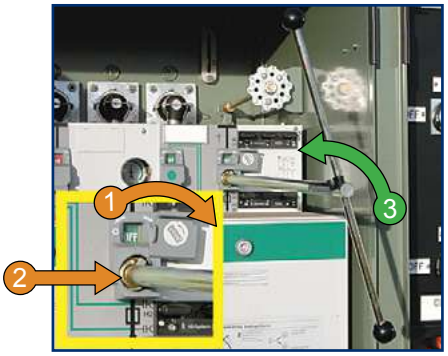
2 Insert the operating handle into the open / close operating mechanism.

3 Push in and rotate the operating handle **ACW** to the stop position then **CW** to the stop position to **CLOSE** the transformer HV switch.

4 Confirm the semaphore

Note: *Confirm the transformer HV switch location and labelling prior to operation.*

Opening the Transformer HV Switch



1 Rotate the transformer HV switch open / close operating mechanism access flap.

2 Insert the operating handle into the open / close operating mechanism.

3 Push in and rotate the operating handle **ACW** marginally to the stop position to **OPEN** the transformer HV switch.

4 Confirm the semaphore agrees with the transformer HV switch status

Note: *Confirm the transformer HV switch location and labelling prior to operation.*

Closing / Opening HV Earth Switches

1 Perform a Safe to Earth Test.

2 Confirm the HV cable / transformer HV switch is open.

3 Rotate the HV earth switch open / close operating mechanism access flap.

4 Insert the operating handle into the HV earth switch operating mechanism.

5 Close / open the HV earth switch as per operating instructions for the HV cable switches.

6 Confirm the semaphore agrees with the HV earth switch status.

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F&G (FELTEN & GUILLEAUME) GA2K (CONTINUED)

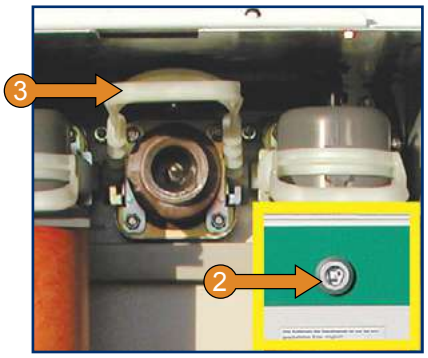
Access to the Transformer HV Fuses

1 Confirm the transformer HV switch is open and the transformer HV earth switch is closed.

2 Insert the supplied HV fuse access cover latch key and rotate **ACW**. Raise and remove the HV fuse access cover.

3 Raise the retaining bale of the HV fuse(s) to be replaced.

4 Withdraw the HV fuse top mounting assembly.



Note: *HV fuses may be hot.*

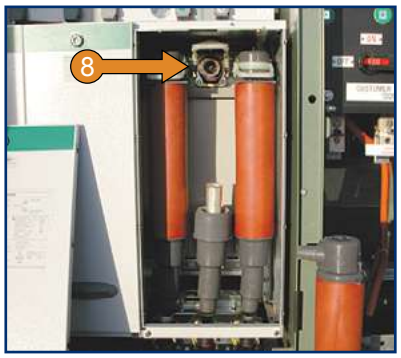
5 Remove the HV fuse from the lower mounting assembly.

6 Replace the HV fuse.

7 Clean and lubricate all contact fittings prior to restoration of the HV fuse mounting assemblies.

8 Lower the HV fuse retaining bale.

9 Replace the HV fuse access cover and latch using the supplied latch key.



Note: *Ensure the HV fuse striker pin is located in the top mounting assembly.*

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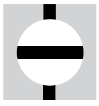
Prior to any operation:

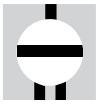
- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the switch location and labelling prior to operating.
- Access Authority required to access HV fuses.

HV Switch Closed



HV Switch Open

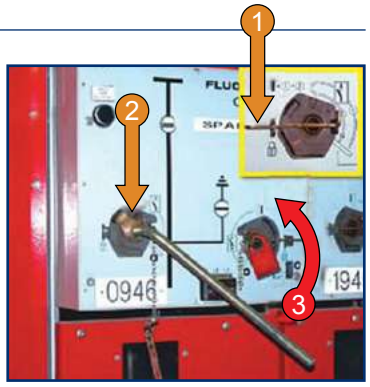
HV Earth Switch Closed



HV Earth Switch Open

Functions: Opening, Closing, Earthing
Rating: 630 Amps
Insulant: SF6
Voltage: 11kV

Closing the HV Cable Switch



1 Unlock if required and slide out the operating handle interlock bar.

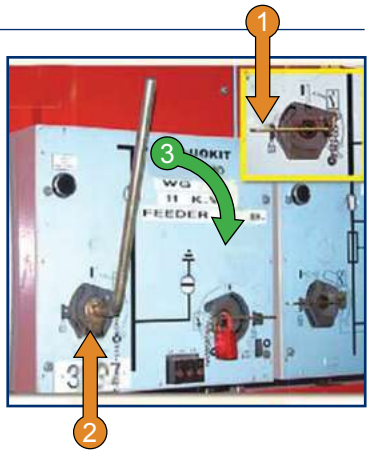
2 Insert the operating handle into the operating mechanism as shown.

3 Rotate the operating handle **ACW** to the stop position to CLOSE the HV switch.

4 Remove the operating handle.

5 Confirm the semaphore shows

Opening the HV Cable Switch



1 Unlock If required and slide out the operating handle Interlock bar.

2 Insert the operating handle into the operating mechanism as shown.

3 Rotate the operating handle **CW** to the stop position to OPEN the HV switch.

4 Remove the operating handle.

5 Confirm the semaphore shows

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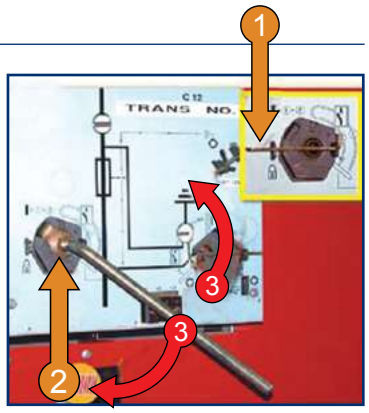
FLUOKIT M (CONTINUED)

Closing the Transformer HV Switch



1 Unlock if required and slide out the operating handle interlock bar.

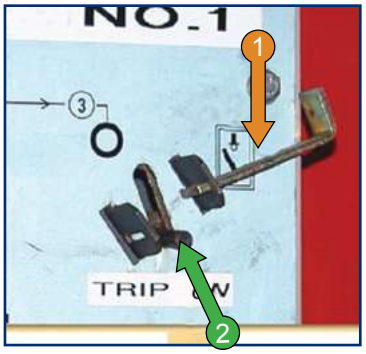
2 Insert the operating handle into the operating mechanism as shown.

3 Rotate the operating handle **ACW** to the stop position to CLOSE the HV switch, then rotate the handle **CW** to charge the tripping mechanism spring.

4 Remove the operating handle.

5 Confirm the semaphore shows

Opening the Transformer HV Switch

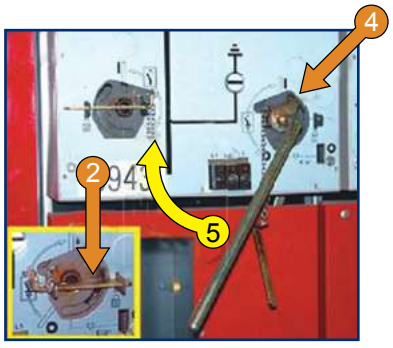


1 Unlock if required and slide out the interlock bar as shown.

2 Raise the trip lever to OPEN the transformer HV switch.

3 Confirm the semaphore shows

Closing the Transformer Earth Switch



1 Confirm the relevant HV switch is open.

2 Unlock if required and slide out the earth switch operating handle interlock bar.

3 Perform a 'Safe To Earth' test using the neon indicators.

4 Insert the operating handle into the earth switch operating mechanism as shown.

5 Rotate the operating handle **CW** to the stop position to CLOSE the earth switch.

6 Remove the operating handle.

7 Confirm the semaphore shows

Note: *Ensure the remote end of the HV cable / transformer to be earthed is isolated.*

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FLUOKIT M (CONTINUED)

Opening the Transformer Earth Switch

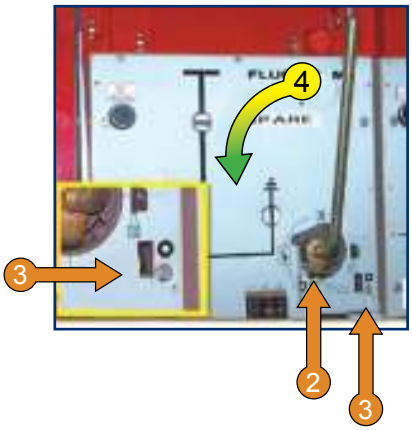
1 Unlock if required and slide out the earth switch operating handle interlock bar.

2 Insert the operating handle into the earth switch operating mechanism as shown.

3 Shift the earth switch interlock lever to the right (as shown) and gently rotate the operating handle **ACW** to the first stop position. Release the interlock lever.

4 Rotate the operating handle **ACW** to the stop position to OPEN the HV earth switch. Remove the operating handle.

5 Confirm the semaphore shows



Access to the HV Fuses

1 Confirm the relevant transformer earth switch is closed**.**

2 Rotate the HV fuse access cover handle **ACW** and remove the access cover to gain access to the HV fuses.

Note: *The replacement HV fuse must be inserted with the striker pin at the top position. HV fuses may be hot.*

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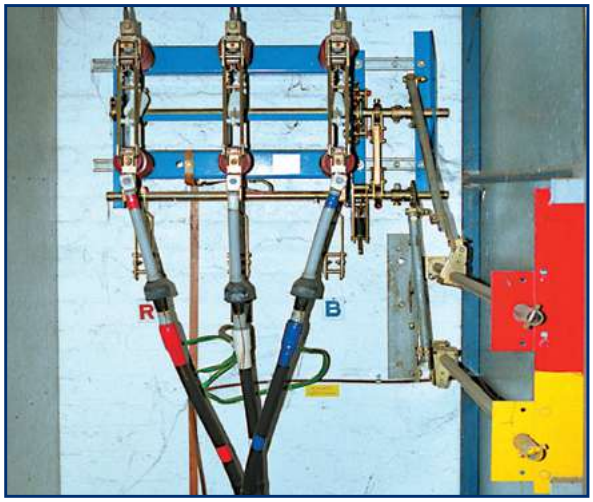
GARDY

Prior to any operation:

- Some Gardy open, close and earth operating mechanisms are the same as for the Calor Emag. Refer to the Calor Emag section of the manual if this is the case.
- This switchgear must be operated with cubicle doors closed.
- Check HV switch is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing, Trans Switch CB, Earthing, HV Fuses
Rating:	630 amps
Insulant:	Air
Voltage:	22 kV



Closing HV Cable Switch

1 Place operating handle on open / close operating mechanism.

2 Rotate operating handle **CW** to CLOSE HV switch.

Opening HV Cable Switch

1 Place operating handle on open / close operating mechanism.

2 Rotate operating handle **ACW** to OPEN HV switch.

VESI Switchgear Manual – February 2018 Copyright © 2018

GARDY (CONTINUED)

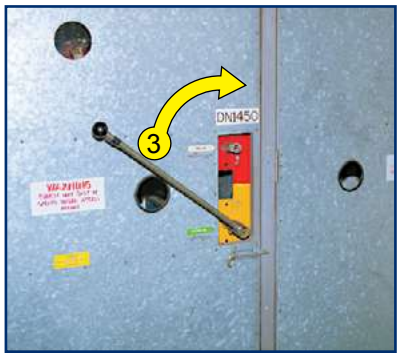
Earthing of HV Cable

1 Carry out Safe to Earth test.

2 Place operating handle on earth switch operating mechanism.

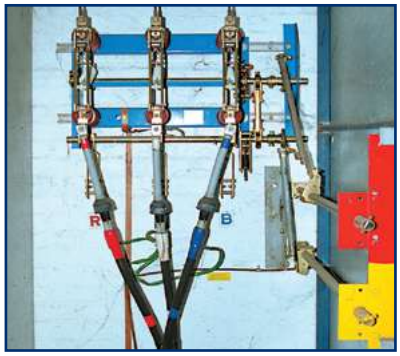
3 Rotate operating handle **CW** to CLOSE HV earth switch.

Note: *Ensure remote end of incoming cable to be earthed is isolated.*



Close/Open/Earth Transformer HV Switch

Operations as per HV cable switch as previous.



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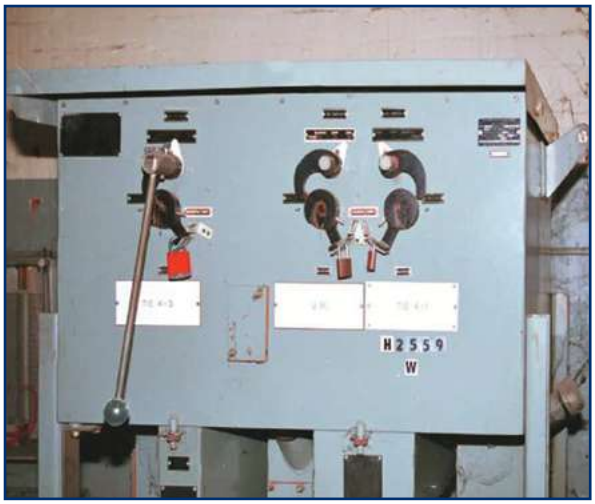
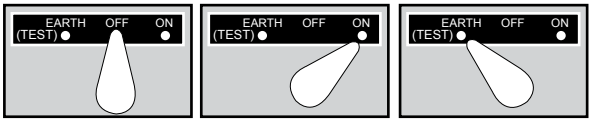
GEC DDDB

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the HV switch oil level is correct prior to operating.
- 'If a 'high pot' test is to be performed on any HV cable attached to this switchgear the entire unit must be included on the access authority.
- Confirm the switch location and labelling prior to operating.
- The direction of the operating handle rotation will depend on the location of the switchgear unit. Confirm the rotation direction prior to operating.
- Access Authority required to access HV fuses.

Functions: Opening, Closing, Earthing
Rating: 400 amps
Insulant: Oil
Voltage: 11kV, 6.6kV





HV Switch Open | HV Switch Closed | Earth Switch Closed

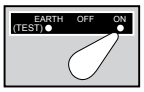
Closing the HV Cable Switch

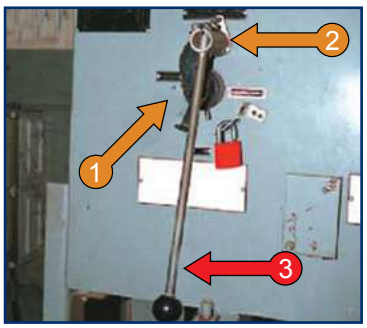
1 Rotate the interlock to the 'ON/OFF' position.

2 Place the operating handle onto the operating mechanism.

3 Rotate the operating handle in the required direction to the stop position to **CLOSE** the HV switch.

4 Remove the operating handle.

5 Confirm the semaphore shows 



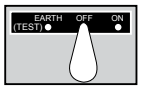
Opening the HV Cable Switch

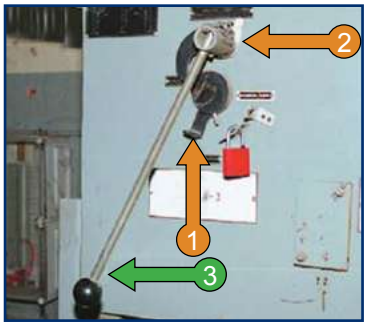
1 Rotate the interlock to the 'ON/OFF' position.

2 Place the operating handle onto the operating mechanism.

3 Rotate the operating handle In the required direction to the stop position to **OPEN** the HV switch.

4 Remove the operating handle.

5 Confirm semaphore shows 



GEC DDDB

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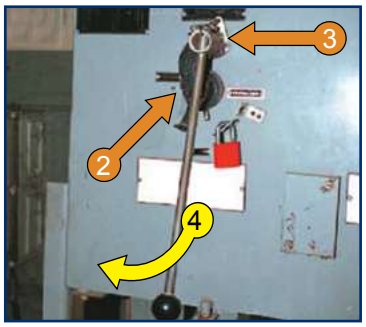
GEC DDDB (CONTINUED)

Closing the HV Cable Earth Switch



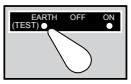
1 Confirm the relevant HV switch is open.

2 Remove the earth padlock and rotate the earth interlock to the 'EARTH/OFF' position.

3 Place the operating handle on the operating mechanism.

4 Rotate the operating handle **CW** to the stop position to **CLOSE** the HV earth switch.

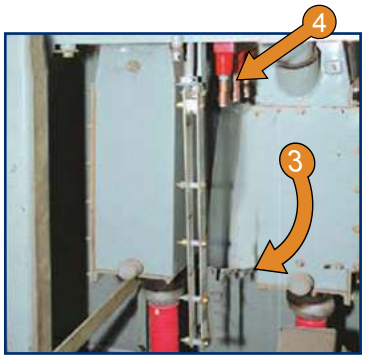
5 Remove the operating handle.

6 Confirm the semaphore shows 

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

Note: *To open HV cable earth switch, rotate handle in anti-clockwise direction.*

Access to the Test Terminals



1 Confirm the relevant earth switch is closed.

2 Unscrew the nut and lower the test terminal access cover box.

3 Pull down the earthing bar as shown to gain access to the test terminals (see 4 on right).

4 Perform tests as required.

Note: *The earthing bar must be reapplied to the test terminals before the access cover box can be closed.*

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LINAK KIOSK AUTOMATING EQUIPMENT

Prior to any operation:

- Linak switch controller can be mounted in either a Schneider RMU or Merlin Gerin RMU kiosk.
- GCR 300 Control Box is used with this equipment.
- For auto control, refer to GCR 300 Control Box.
- Confirm HV switch is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV, 11kV

Isolating from Remote Operation – Placing in Local Mode

After attempting to reset the Controller has proven unsuccessful, isolation from Remote operation is undertaken as follows:

1 Open and remove padlock, then lift and remove Drive Motor plate.

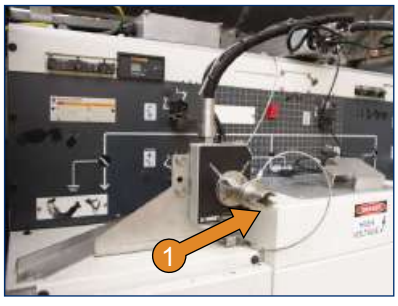
2 Turn to LOCAL mode to isolate the Motor Controller from remote operation.

The LINK motor controller ‘ERROR’ light will be illuminated RED, this is normal.

Manual Operation of HV Switch

Confirm that LINAK Drive Motor is in ‘LOCAL’ operation mode as per Section B prior to commencing manual operation

The LINAK motor controller ‘ERROR’ light will be illuminated RED in ‘local’ mode, this is normal.



1 Attach HV handle linkage that is attached to a cable and sitting on top of the HV switch enclosure.

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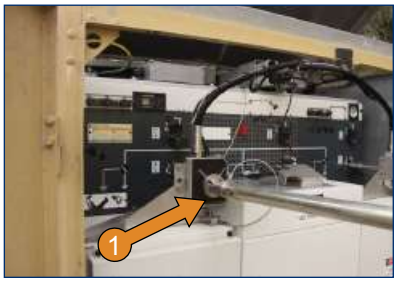
LINAK KIOSK AUTOMATING EQUIPMENT (CONTINUED)

1 Insert switch handle to manually operate HV switch whilst in LOCAL mode.



Isolation of HV Switch

Confirm that Linak Drive Motor is in 'LOCAL' operation mode.

The LINAK motor controller 'ERROR' light will be illuminated RED in 'local' mode, this is normal.

1 Confirm HV switch is open.

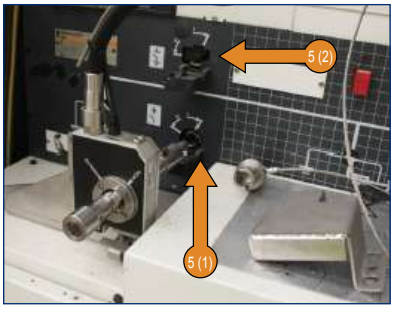
2 Contact Network Control and confirm isolation

3 Lift spring loaded drive shaft locator lock, and

4 Slide drive shaft out of switch handle socket to prevent further operation of HV switch.

5 Replace drive motor cover plate & lock ensuring the following:

- Drive motor remained in 'LOCAL' operating mode.
- Drive shaft remains removed /disengaged from the switch handle socket to prevent further operation of HV switch and activate the interlocking function to close the HV switch shutter (1) and allow access to the earth switch (2).



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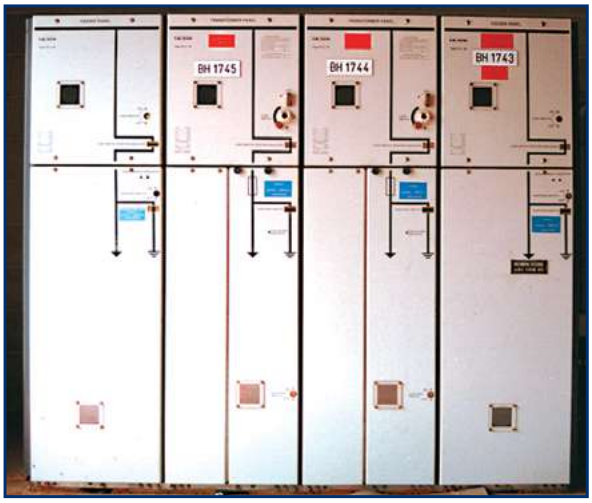
LK NES TYPE ELC 24

Prior to any operation:

- Confirm HV switch is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.
- Access Authority is required for access to HV fuses.

Functions:	Opening, Closing, Trans Switch CB, Earthing, HV Fuses
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV

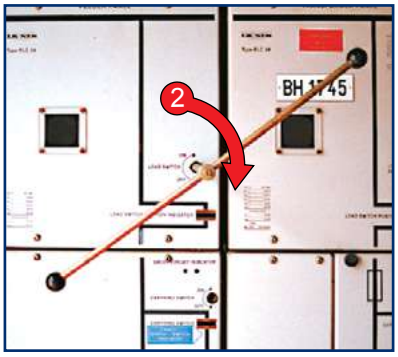


Closing HV Cable Switch

1 Insert operating handle into 'On/Off' operating mechanism.

2 Rotate operating handle **CW** to CLOSE HV switch.

3 Confirm semaphore agrees with switch status.

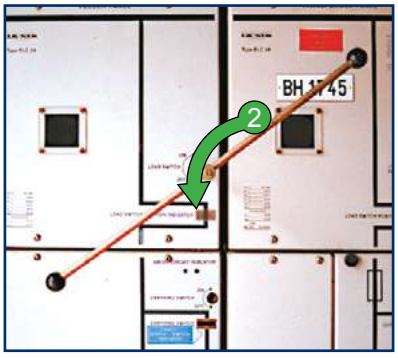


Opening HV Cable Switch

1 Insert operating handle into 'On/Off' operating mechanism.

2 Rotate operating handle **ACW** to OPEN HV switch.

3 Confirm semaphore agrees with switch status.



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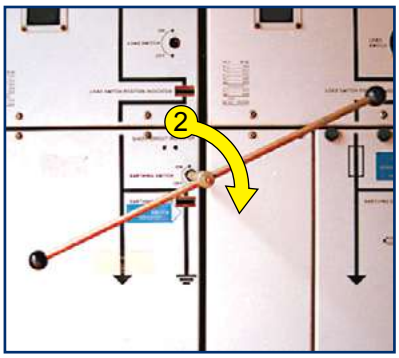
LK NES TYPE ELC 24 (CONTINUED)

Earthing of HV Cable

1 Insert operating handle into HV earth 'On/Off' operating mechanism.

2 Rotate operating handle **CW** to **CLOSE** HV earth switch.

3 Confirm semaphore agrees with switch status.



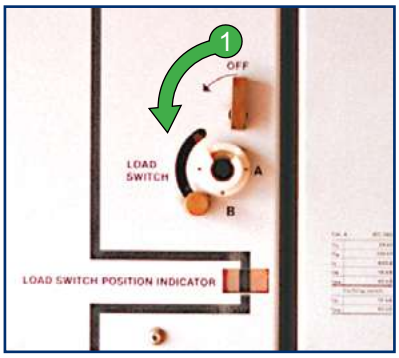
Note: *Ensure remote end of incoming cable to be earthed is isolated.*

Note: *To open HV earth switch, rotate handle in anti-clockwise direction.*

Opening Transformer HV Switch

1 Move operating trip lever **ACW** to 'Off' position to **OPEN** transformer HV switch.

2 Confirm semaphore agrees with switch status.



Closing Transformer HV Switch

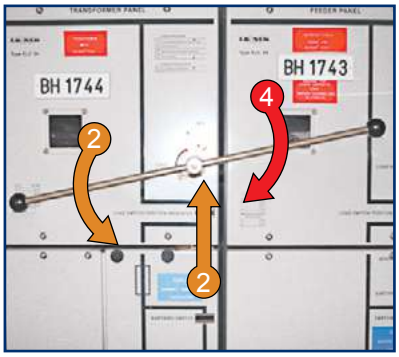
1 Insert operating handle into transformer HV switch operating mechanism.

2 Rotate handle slightly **ACW** and pull out interlock knob 'B'.

3 With interlock knob 'B' pulled out, rotate operating handle slightly **CW** to neutral position.

4 Rotate operating handle **CW** to stop position to **CLOSE** transformer HV switch. Confirm semaphore.

5 Rotate operating handle **ACW** to stop position to recharge operating spring.



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LK NES TYPE ELC 24 (CONTINUED)

Earthing of Transformer HV Cable

1 With transformer HV switch open , insert operating handle into transformer HV earth switch operating mechanism.

2 Rotate handle **CW** to **CLOSE** transformer HV earth switch.

3 Confirm semaphore agrees with switch status.

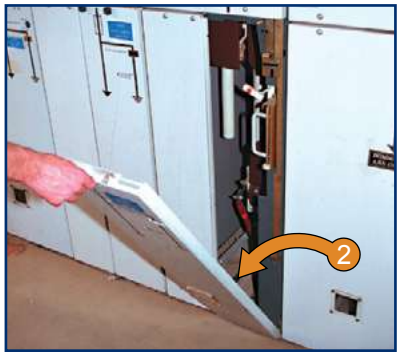
Note: *If unable to carry out Safe to Earth test at HV switch unit, do so at transformer LV connections.*

Note: *To open transformer HV cable earth switch, rotate handle in anti-clockwise direction.*

Access to HV Fuses

1 With transformer HV earth switch closed, undo the two (2) HV fuse access cover retaining screws.

2 Remove HV fuse access cover.



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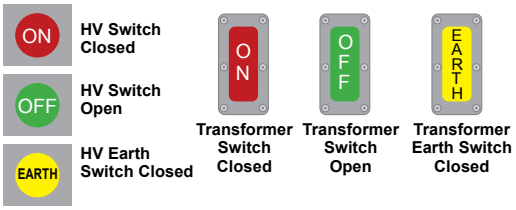
LUCY FRMU

Functions:	Opening, Closing, Racking, Trans Switch/CB, Earthing
Rating:	630 amps
Insulant:	Oil
Voltage:	11kV, 6.6kV

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the HV switch oil level is correct prior to operating.
- Note: Some Lucy FRMU units have a lockable access cover over the HV switch operating mechanisms, as shown In the main picture insert.
- Confirm the switch location and labelling prior to operating.
- Note: The direction of the operating handle rotation will depend on the location of the HV switch on the switchgear unit. Confirm the rotation direction prior to operating.



Closing the HV Cable Switch

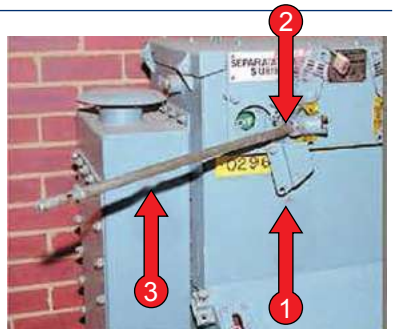
1 Rotate the HV switch operating mechanism cover plate.

2 Insert the operating handle into the operating mechanism. (The number on the operating handle head aligns with the number on the operating mechanism instruction plate).

3 Rotate the operating handle in the direction as indicated to close the HV switch.

4 Remove the operating handle.

5 Confirm the semaphore shows



Opening the HV Cable Switch

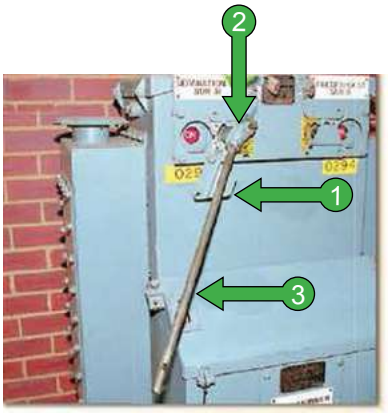
1 Rotate the HV switch operating mechanism cover plate.

2 Insert the operating handle into the operating mechanism. (The number on the operating handle head aligns with the number on the operating mechanism Instruction plate)

3 Rotate the operating handle in the direction as indicated to open the HV switch.

4 Remove the operating handle.

5 Confirm the semaphore shows.



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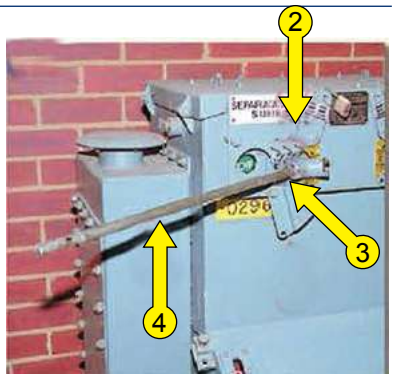
LUCY FRMU (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm the relevant HV switch is open.

2 Unlock and rotate the earthing interlock lever to the stop position.

3 Insert operating handle into the operating mechanism.(The number on the operating handle head aligns with the number on the operating mechanism instruction plate)

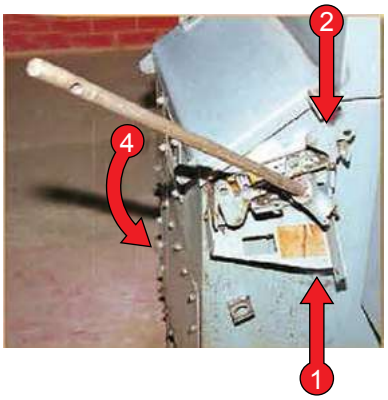
4 Rotate the operating handle in the direction as indicated to CLOSE the HV earth switch.

5 Remove the operating handle.

6 Confirm the semaphore shows

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

Closing the Transformer HV Switch



1 Lower the operating mechanism access cover.

2 Lift the 'MOVE FOR ON' handle access interlock cover as shown.

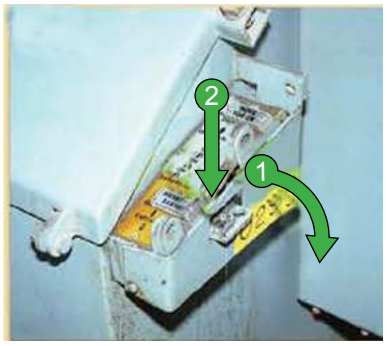
3 Insert the operating handle into the operating mechanism. (The number on the operating handle head aligns with the number on the operating mechanism Instruction plate)

4 Rotate the operating handle in the direction indicated to close transformer HV switch.

5 Remove the operating handle and close the access cover.

6 Confirm semaphore shows

Opening the Transformer HV Switch



1 Lower the operating mechanism access cover.

2 Press down the transformer HV switch 'TO TRIP' lever to open the transformer HV switch.

3 Close the access cover.

4 Confirm the semaphore shows.

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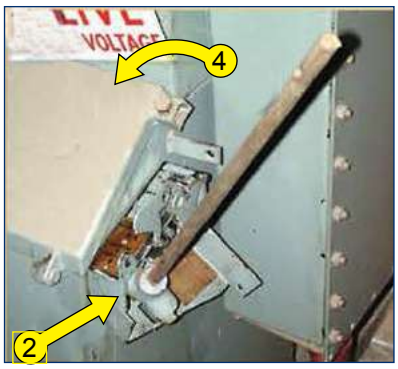
LUCY FRMU (CONTINUED)

Closing the Transformer HV Cable Earth Switch



1 Confirm the relevant transformer HV switch is open.

2 Lower the earth switch operating mechanism access cover plate.

3 Insert the operating handle into the earth switch operating mechanism. (The number on the operating handle head aligns with the number on the earth switch operating mechanism instruction plate)

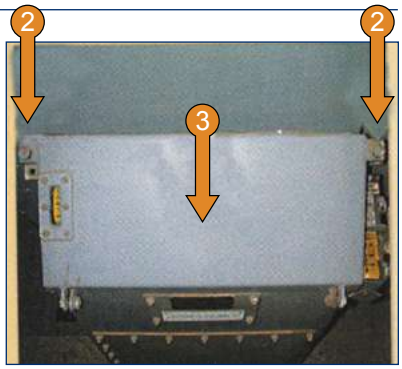
4 Rotate the operating handle in the direction as indicated to close the transformer HV earth switch.

5 Remove the operating handle and close the access cover.

6 Confirm the semaphore shows.

Note: *If required perform a 'Safe to Earth' test at the transformer connections.*

Access to the HV Fuses



1 Confirm the transformer HV earth switch is closed.

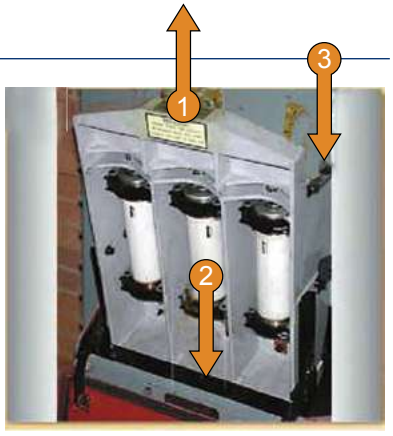
2 Unscrew the two (2) HV fuse access cover locking bolts.

3 Swing open the HV fuse access cover.

4 Slowly raise the HV fuse carriage until it reaches the latching position.

Note: *Ensure the HV fuse carriage latches correctly when fully raised.*

Restoring the HV Fuse Carriage to the Service Position



1 Raise the HV fuse carriage slightly and press the locking latch to release carriage.

2 Slowly lower the HV fuse carriage to the stop position.

3 Close the HV fuse access cover and replace two (2) locking bolts.

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LUCY FRMU (CONTINUED)

Opening Transformer HV Earth Switch

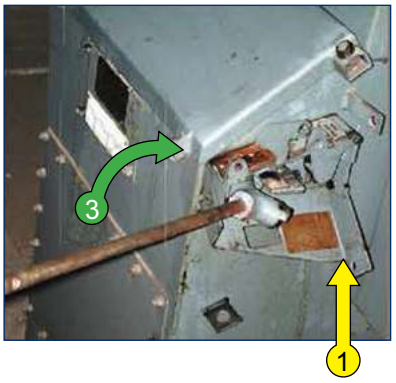
1 Lower the earth switch operating mechanism access cover plate.

2 Insert the operating handle Into the earth switch operating mechanism.(The number on the operating handle head aligns with the number on the earth switch operating mechanism instruction plate)

3 Rotate the operating handle in the direction as indicated to open the transformer HV earth switch.

4 Remove the operating handle and close the access cover.

5 Confirm the semaphore shows



Resetting the HV Fuse Switch

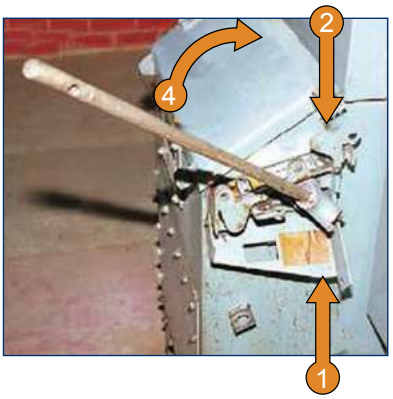
1 Lower the operating mechanism access cover.

2 Lift the ‘MOVE FOR ON’ handle access interlock cover.

3 Insert the operating handle into the operating mechanism. (The number on the operating handle head aligns with the number on the operating mechanism Instruction plate)

4 Rotate the operating handle in the direction indicated to reset HV the fuse switch.

5 Remove the operating handle and close the access cover.



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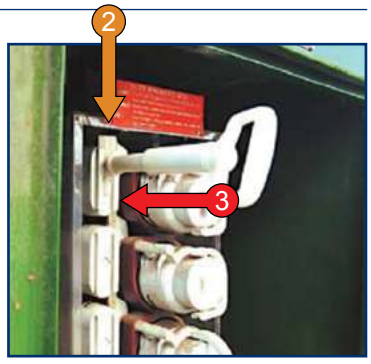
MAGNEFIX MD4

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm switch location and labelling prior to operation.
- Only to be operated under de-energised condition.

Functions:	Opening, Closing, Trans Switch, HV Fuses
Rating:	400 amps
Insulant:	Air
Voltage:	11kV

Energising the Transformer



1 If required ensure the HV fuses have been replaced correctly and the fuse access interlocks are rotated fully to the stop position.

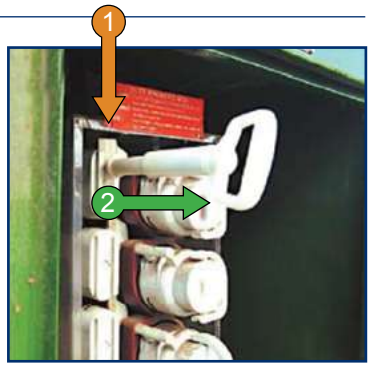
2 Attach the insertion / removal handle to the switchcap.

3 Place the switchcap gently against the stop on the fixed section of the switchgear and push in energetically as shown.

4 Repeat for all three phases.

Note: *Place the bottom switchcap into position first followed by the middle switchcap then the top switchcap.*

Isolating the Transformer



1 Attach the insertion / removal handle to the switchcap.

2 Withdraw the switchcap energetically and store in a clean, dry environment.

3 Repeat for all three phases.

Note: *Remove the top switchcap first followed by the middle switchcap then the bottom switchcap.*

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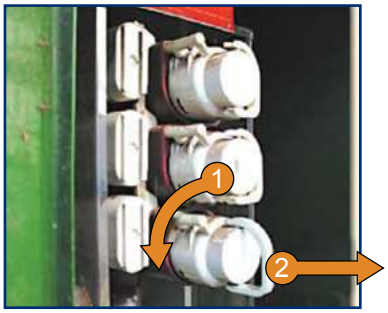
MAGNEFIX MD4 (CONTINUED)

Removing the HV Fuses

1 With all three (3) switchcaps removed, rotate the HV fuse access interlock **ACW** to the stop position.

2 Grasp the HV fuse extraction handle and withdraw the HV fuse.

Note: *HV fuses may be hot.*



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MERLIN GERIN RM6

Prior to any operation:

- Depending on the HV switch configuration the HV earth switch may be on either the outgoing or incoming HV cable. Confirm the HV earth switch configuration prior to closing.
- If the HV switch is equipped with a gas indication gauge check for correct pressure prior to switching.
- Confirm the HV switch location and labelling prior to operation.
- Access Authority required to access HV fuses.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	200 Amps
Insulant:	SF6
Voltage:	66KV, 22kV, 11kV

Closing the HV Switch

1 Insert the operating handle into the HV switch close mechanism as shown.

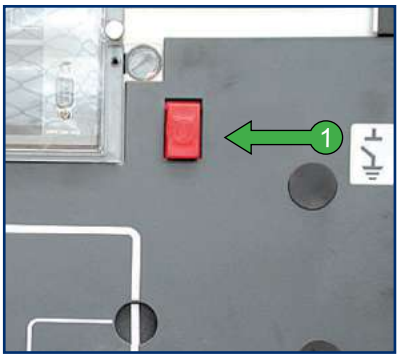
2 Rotate the handle **CW** to the stop position to CLOSE HV switch. Note: Closing the HV switch also charges the trip spring.

3 Confirm the semaphore agrees with the HV switch status.

Opening the HV Switch

1 Press the red push button marked ‘0’ to OPEN the HV switch.

2 Confirm the semaphore agrees with the HV switch status.



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MERLIN GERIN RM6

Closing the HV Earth Switch

1 Perform a “Safe To Earth’ test.

2 Insert the operating handle into the HV earth switch open/close mechanism as shown.

3 Rotate the handle **CW** to the stop position to **CLOSE** the HV earth switch.

4 Confirm the semaphore agrees with the HV earth switch status.

Note: *Rotate the handle anti-clockwise to open the HV earth switch.*

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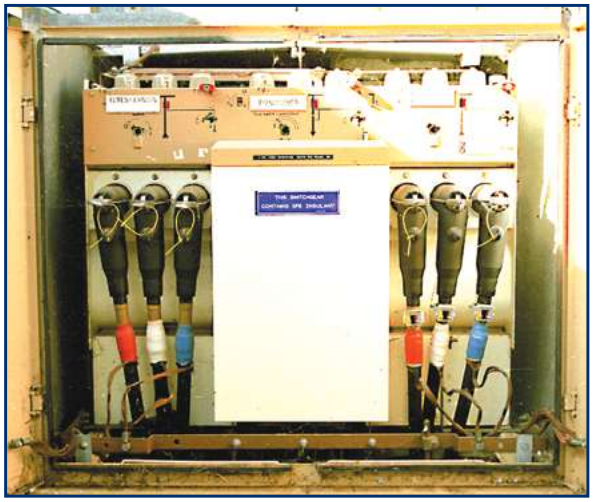
MERLIN GERIN RM6 TYPE 2

Prior to any operation:

- If equipped with a gas indication gauge, check for correct pressure prior to switching.
- Confirm switch location and labelling prior to operation
- Access Authority required for access to HV fuses.

Functions:	Opening, Closing, Trans Switch/ CB. Earthing, HV Fuses
Rating:	400/630 amps
Insulant:	SF6
Voltage:	11kV, 22kV

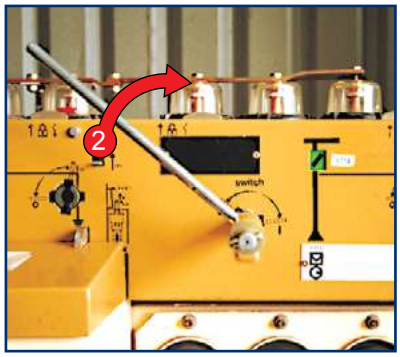


Closing HV Cable Switch

1 Insert operating handle into open/close mechanism.

2 Rotate handle **CW** to CLOSE HV switch.

3 Confirm semaphore agrees with switch status.

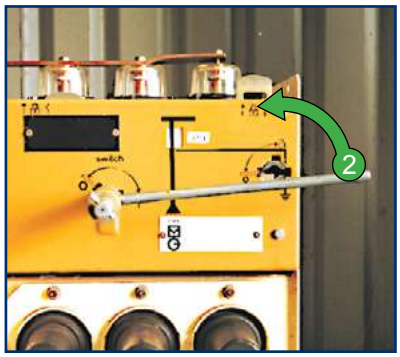


Opening HV Cable Switch

1 Insert operating handle into open/close mechanism.

2 Rotate handle **ACW** to OPEN HV switch.

3 Confirm semaphore agrees with switch status.



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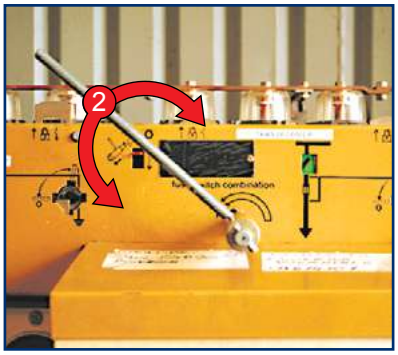
MERLIN GERIN RM6 TYPE 2 (CONTINUED)

Closing Transformer HV Switch

1 Insert operating handle into open/close mechanism.

2 Rotate handle **CW** to **CLOSE** transformer HV switch, then rotate **ACW** to stop position to charge HV switch operating spring.

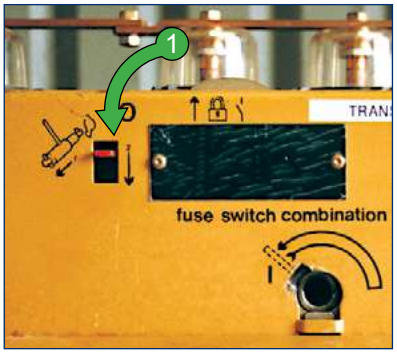
3 Confirm semaphore agrees with switch status.



Opening Transformer HV Switch / CB

1 Press down red tab to **OPEN** transformer HV switch.

2 Confirm semaphore agrees with switch status.



Earthing of HV Cable / Transformer

1 Carry out Safe to Earth test.

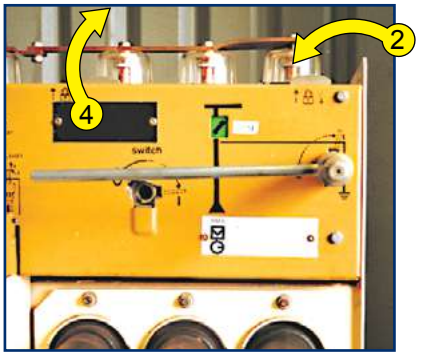
2 Unlock and lower HV earth switch access interlock.

3 Insert operating handle into HV earth switch operating mechanism.

4 Rotate handle **CW** to stop position to **CLOSE** HV earth switch.

5 Confirm semaphore agrees with switch status.

Note: *To open transformer HV cable earth switch, rotate handle in anti-clockwise direction.*



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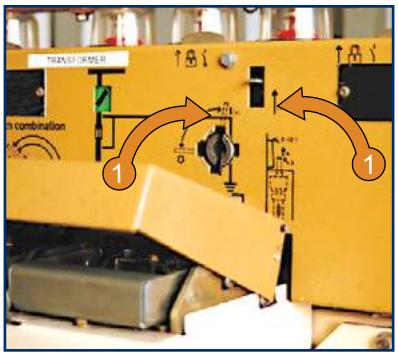
MERLIN GERIN RM6 TYPE 2 (CONTINUED)

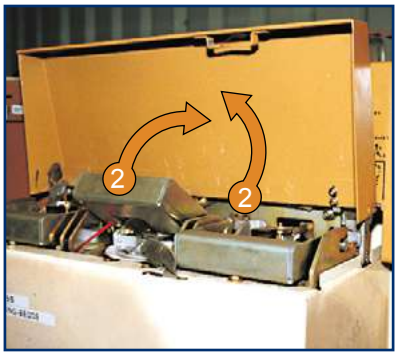
Access to HV Fuses

1 With transformer HV earth switch closed (operation as per earthing of HV cable / transformer), raise the HV fuse access cover interlock tag and raise the HV fuse access cover.



2 With HV fuse cover raised to the stop position, raise the HV fuse cradle locating handle.

3 Pull up the HV fuse cradle assembly to withdraw HV fuse.



Note: *HV fuse may be hot.*

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MERLIN GERIN RM6 - HV FUSES/CB TYPE 1

Prior to any operation:

- If equipped with a gas indication gauge check for correct pressure prior to switching.
- Main picture insert shows RM6 unit with a CB controlling the transformer. Apart from access to HV fuses, operating instructions remain the same for both units.
- Confirm switch location and labelling prior to operation.
- Access Authority required for access to HV fuses.

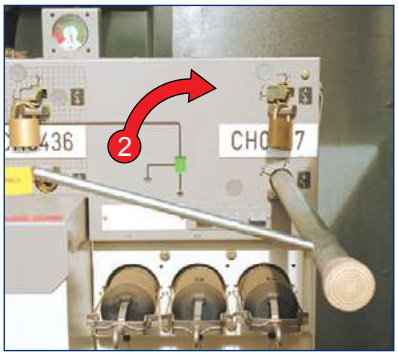
Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	400/630 amps
Insulant:	SF6
Voltage:	11kV, 22kV

Closing HV Cable Switch

1 Insert operating handle into open/close mechanism.

2 Rotate handle **CW** to CLOSE HV switch.

3 Confirm semaphore agrees with switch status.

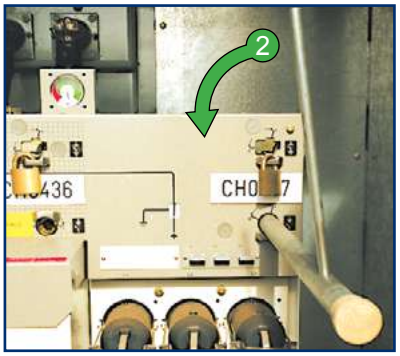


Opening HV Cable Switch

1 Insert operating handle into open/close mechanism.

2 Rotate handle **ACW** to OPEN HV switch.

3 Confirm semaphore agrees with switch status.



MERLIN GERIN RM6 - HV FUSES/CB TYPE 1

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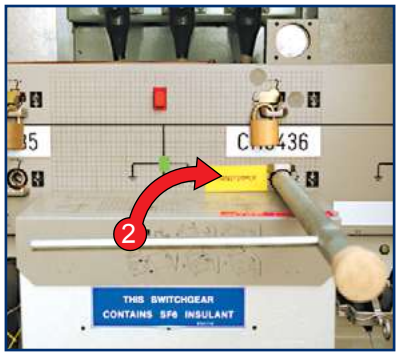
MERLIN GERIN RM6 - HV FUSES/CB TYPE 1 (CONTINUED)

Closing Transformer HV Switch

1 Insert operating handle into open/close mechanism.

2 Rotate handle **CW** to **CLOSE** transformer HV switch.

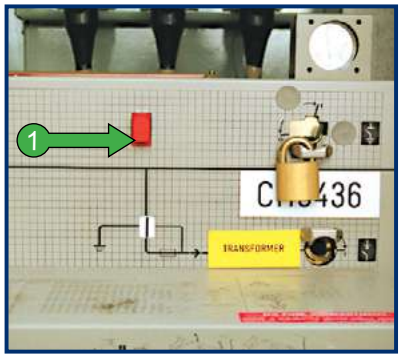
3 Confirm semaphore



Opening Transformer HV Switch / CB

1 Press red push button marked 'O' to **OPEN** transformer HV switch.

2 Confirm semaphore agrees with switch status.



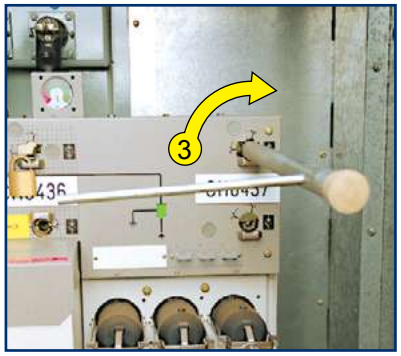
Earthing of HV Cable/Transformer

1 Carry out Safe to Earth test.

2 Insert operating handle into earth switch operating mechanism.

3 Rotate handle **CW** to **CLOSE** HV earth switch.

4 Confirm semaphore agrees with switch status



Access to HV Fuses

1 With transformer HV earth switch closed (operation as per earthing of HV cable / transformer) raise the HV fuse access cover marginally then pull away form the HV switch unit to gain access to the HV fuses.

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MERLIN GERIN RM6 – TALUS 200 REMOTE CONTROL

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the correct SF6 gas pressure prior to any operation. Refer to the Schneider / Merlin Gerin SF6 Gas Pressure Gauge template for instructions if required.
- Note the HV switch can be operated manually or by the remote control unit.
- Note the remote control does not operate the transformer HV switch (Indicates the HV switch status only).
- Confirm the HV switch location and labelling prior to operating.
- Remote electrical operation of the HV switch is always the preferred method.

Functions:	Opening, Closing, Earthing, Fault Indicators, Transformers
Rating:	630 amps
Insulant:	SF6
Voltage:	22kV, 11kV, 6.6kV

HV Switch Closed

HV Switch Open

Earth Switch Closed

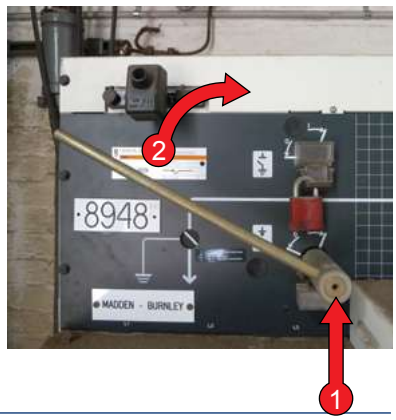
Closing the HV Switch – Manually

1 Insert the operating handle into the operating mechanism.

2 Rotate the operating handle **CW** to the stop position to **CLOSE** the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows



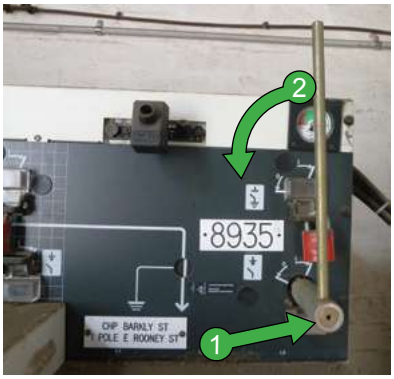
Opening the HV Switch – Manually

1 Insert the operating handle into the operating mechanism.

2 Rotate the operating handle **ACW** to the stop position to open the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows



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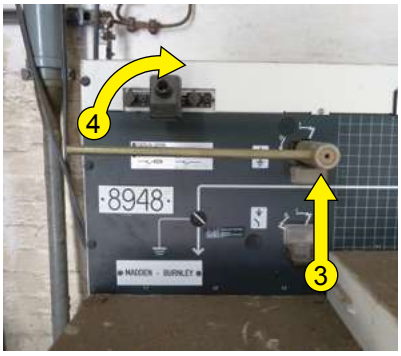
MERLIN GERIN RM6 – TALUS 200 REMOTE CONTROL (CONTINUED)

Closing the HV Cable / Transformer Earth Switch



1 Confirm the relevant HV switch is open

2 Perform a 'Safe to Earth' Test.

3 Unlock and remove the padlock and insert the operating handle into the HV earth switch operating mechanism.

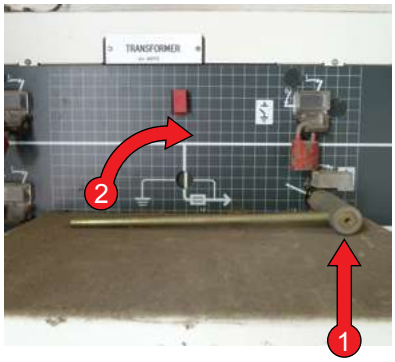
4 Rotate the operating handle **CW** to the stop position to **CLOSE** the HV earth switch.

5 Remove the operating handle.

6 Confirm the semaphore shows

Note: *Ensure the remote end of incoming HV cable to be earthed is isolated.*

Closing Transformer HV Switch



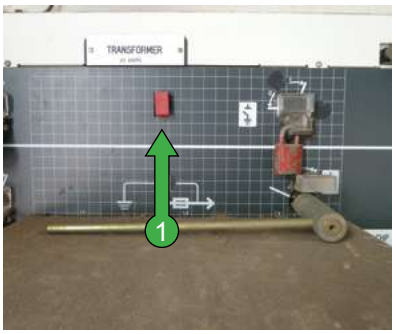
1 Insert the operating handle into the transformer HV switch operating mechanism.

2 Rotating the operating handle **CW** to the stop position to **CLOSE** the transformer HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows

Opening Transformer HV Switch



1 Press the **red** trip button to open the transformer HV switch.

2 Confirm the semaphore shows

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MERLIN GERIN RM6 – TALUS 200 REMOTE CONTROL (CONTINUED)

Closing the HV Switch – Local Electrical

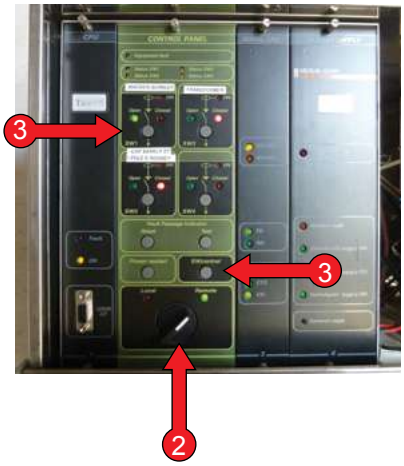
1 Unlock and remove the remote operation control panel access cover.

2 Rotate the control switch from ‘Remote’ to the ‘Local’ position as shown.

3 Simultaneously press the ‘SW control’ button and the required HV switch button to **CLOSE** the HV switch.

4 Confirm the indicating lights and the semaphores agree with the HV switch status.

5 If required, restore the control switch to the ‘Remote’ position.



Opening the HV Switch – Local Electrical

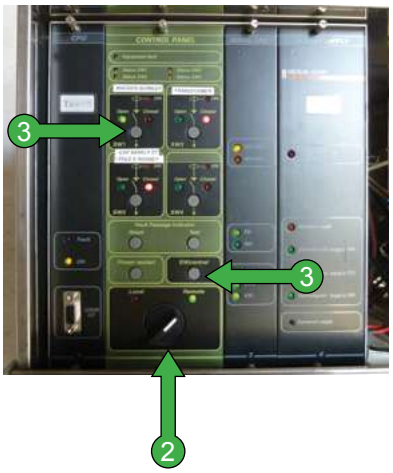
1 Unlock and remove the remote operation control panel access cover.

2 Simultaneously press the ‘SW control’ button and the required HV switch button to open the HV switch.

3 Confirm the indicating lights and the semaphores agree with the HV switch status.

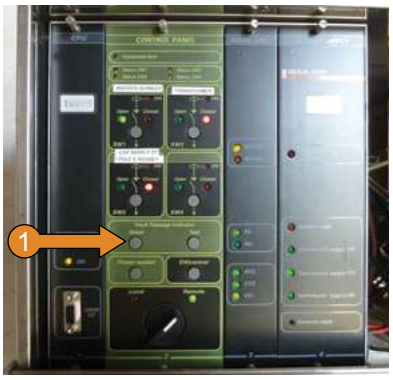
4 If required, restore the control switch to the ‘Remote’ position.

Note: *For Access Authority the control switch must be in the ‘LOCAL’ position and appropriately tagged.*



Resetting the Fault Indicators

1 Press the ‘RESET’ button to reset the fault indicators.



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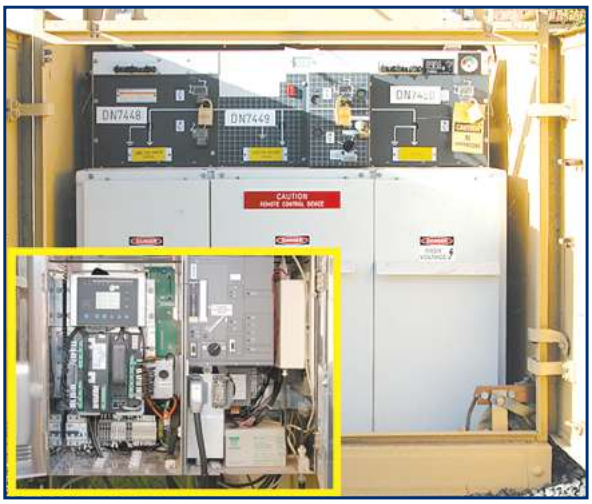
MERLIN GERIN RM6 - TALUS DNP3 REMOTE CONTROL

Prior to any operation:

- Confirm correct SF6 gas pressure via the gas pressure gauge prior to and after operation.
- Remote electrical operation is always the preferred method.
- For any local operation ensure the 'Remote / Local' (L / R) switch is in the 'Local' (L) position.
- Prior to local electrical operation confirm the remote control box is powered for service.
- Confirm the CB Isolating Switch location and labelling prior to operation

Functions:	Opening, Closing, Trans Switch/ CB. Earthing, Earth Leakage Protection, O/C Protection
Rating:	630 amps
Insulant:	SF6
Voltage:	22kV



Closing the Remote Control CB Isolating Switch – Manually

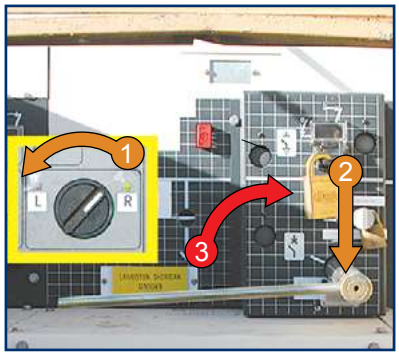
1 At the remote control box - located in the LV end of the kiosk substation - rotate the 'R/L' switch to the 'L' position.

2 Lower the CB Isolating Switch operating mechanism access flap and insert the operating handle.

3 Rotate the operating handle **CW** to the stop position to **CLOSE** the CB Isolating Switch.

4 Remove the operating handle, raise the access flap.

5 Confirm the semaphore agrees with the CB Isolating Switch status.

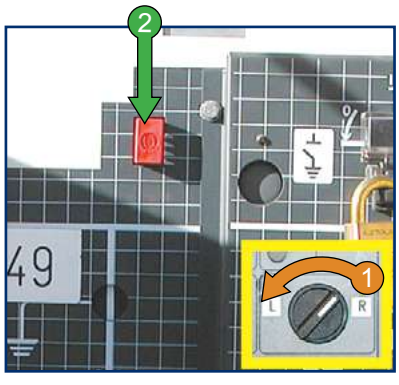


Opening the Remote Control CB Isolating Switch – Manually

1 At the remote control box - located in the LV end of the kiosk substation - rotate the 'Remote / Local' (L / R) switch to the 'Local' (L) position.

2 Push the red 'O' button to **OPEN** the CB Isolating Switch.

3 Confirm the semaphore agrees with the CB Isolating Switch status.



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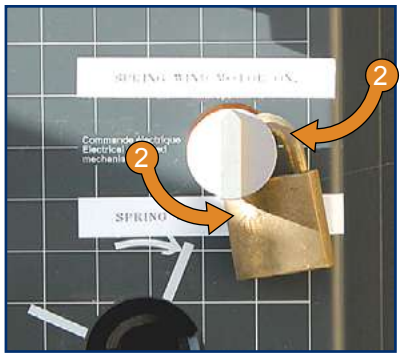
MERLIN GERIN RM6 - TALUS DNP3 REMOTE CONTROL (CONTINUED)

Locking the CB Isolating Switch for Access Permit Isolation

1 Confirm the CB Isolating Switch is open

2 Confirm the Remote / Local (R/L) switch is in the 'L' position.

3 Rotate the 'SPRING WIND MOTOR' switch 180 degrees to the 'SPRING WIND MOTOR OFF' position and attach a padlock as shown.



Opening / Closing the CB Isolating Switch Earth Switch

1 Confirm the CB Isolating Switch is open

2 Confirm the 'Remote / Local' (L / R) switch is in the 'Local' (L) position.

3 Confirm the 'SPRING WIND MOTOR' switch is in the 'SPRING WIND MOTOR OFF' position.

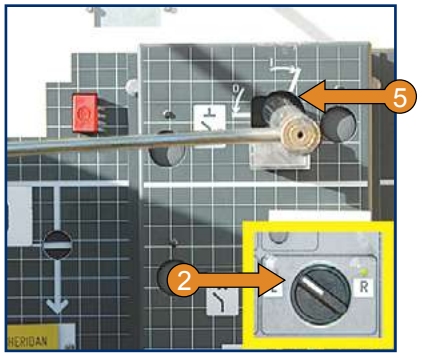
4 Using an approved testing device perform a 'Safe to Earth' test.

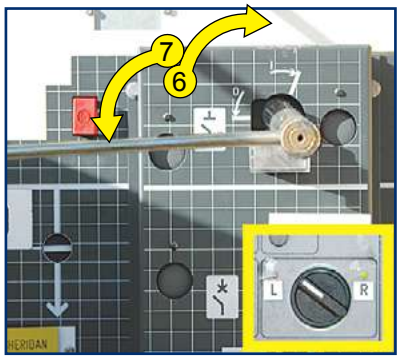
5 Unlock and lower the earth switch operating mechanism access flap and insert the operating handle.

6 Rotate the operating handle **CW** to the stop position to **CLOSE** the CB Isolating Switch earth switch.

7 Rotate the operating handle **ACW** to the stop position to **OPEN** the CB Isolating Switch earth switch.

8 Confirm the semaphore agrees with the CB Isolating Switch earth switch status.





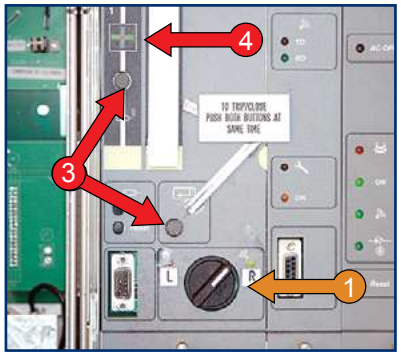
Closing the CB Isolating Switch Local - Electrically

1 At the remote control box - located in the LV end of the kiosk substation - rotate the 'Remote / Local' (L / R) switch to the 'Local' (L) position.

2 Confirm the 'SPRING WIND MOTOR' switch is in the 'SPRING WIND MOTOR ON' position.

3 Press the black CB Isolating Switch control button and the button simultaneously to **CLOSE** the CB Isolating Switch.

4 Confirm the indication light semaphore agrees with the CB Isolating Switch status.



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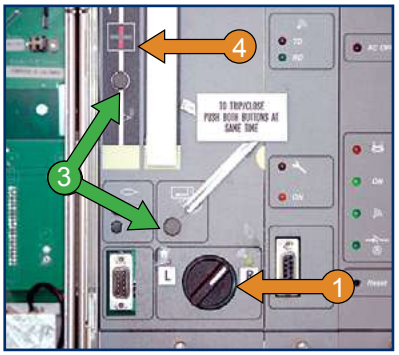
MERLIN GERIN RM6 - TALUS DNP3 REMOTE CONTROL (CONTINUED)

Opening the CB Isolating Switch Local - Electrically



1 At the remote control box - located in the LV end of the kiosk substation - rotate the 'Remote / Local' (L / R) switch to the 'Local' (L) position.

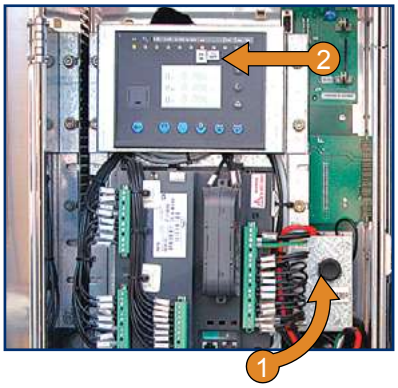
2 Confirm the 'SPRING WIND MOTOR' switch is in the 'SPRING WIND MOTOR ON' position.

3 Press the black CB Isolating Switch control button and the button simultaneously to **OPEN** the CB Isolating Switch.

4 Confirm the indication light semaphore agrees with the CB Isolating Switch status.

Note: *If the CB Isolating Switch is an isolation for an Access Permit ensure the 'Remote / Local' (L / R) switch remains in the 'Local' (L) position and tag if required.*

Suppressing the CB Isolating Switch E/L Protection



1 Press the 'E/L SELECTOR' button to suppress the CB Isolating Switch earth leakage protection.

2 Confirm the earth leakage protection is suppressed via the yellow 'E/L SUPP' LED.

3 To restore the earth leakage protection press the 'E/L SELECTOR' button and confirm via the 'E/L ON' LED.

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MERLIN GERIN SM6

Prior to any operation:

- If equipped with a gas indication gauge check for adequate pressure prior to switching.
- Confirm switch location and labelling prior to operation.
- Access Authority is required for access to HV fuses.

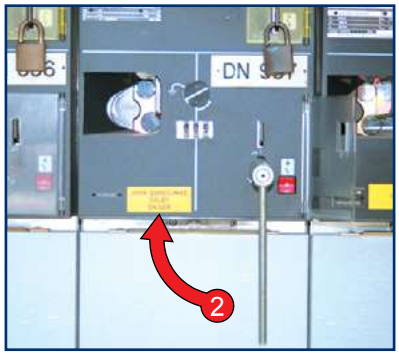
Functions:	Opening, Closing, Trans Switch/ CB. Earthing, HV Fuses
Rating:	630 amps
Insulant:	SF6
Voltage:	22kV

Closing HV Cable Switch

1 Insert operating handle into operating mechanism.

2 Rotate handle **CW** to CLOSE HV switch.

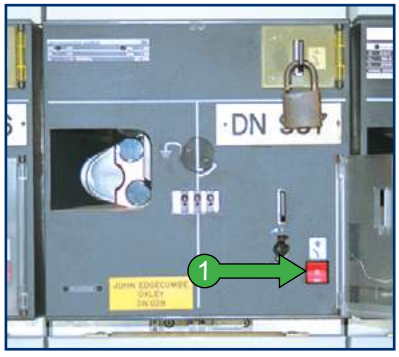
3 Confirm semaphore agrees with switch status.



Opening HV Cable Switch

1 Press red 'Off' button to OPEN HV switch.

2 Confirm semaphore agrees with switch status.



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MERLIN GERIN SM6 (CONTINUED)

Closing Transformer CB

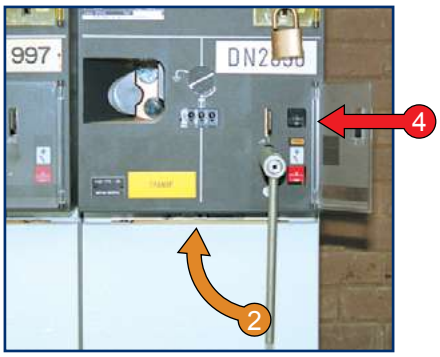
1 Insert operating handle into transformer CB spring charge mechanism.

2 Rotate operating handle **CW** to charge operating spring.

3 Remove operating handle.

4 Press black 'On' button to CLOSE CB.

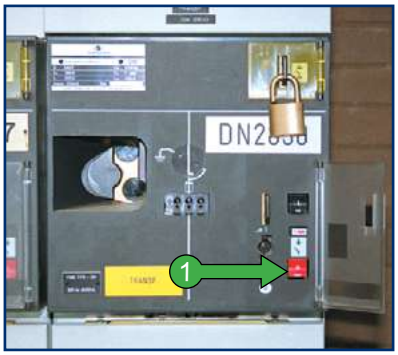
5 Confirm semaphore status.



Opening Transformer CB

1 Press red 'Off' button to OPEN transformer CB.

2 Confirm semaphore agrees with switch status.



Earthing of HV Cable / Transformer

1 Carry out Safe to Earth test.

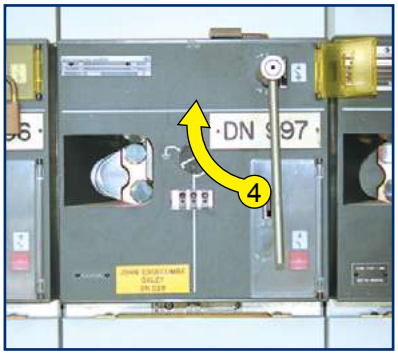
2 Unlock and open earth switch access flap.

3 Insert operating handle into earth switch operating mechanism.

4 Rotate handle **CW** to CLOSE HV earth switch.

5 Confirm semaphore agrees with switch status.

Note: *Rotate the handle anti-clockwise to open the HV earth switch.*



HV Fuse Access

1 With transformer HV earth switch closed (operation as per earthing of HV cable) remove HV fuse access cover panel.

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MERLIN GERIN SM6 – AUTO CHANGE OVER

Prior to any operation:

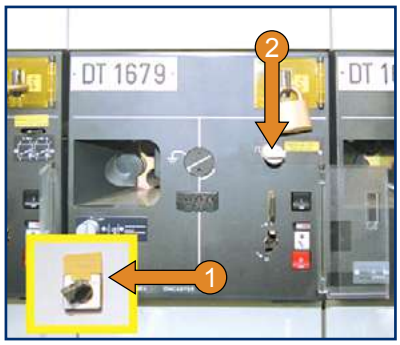
- If equipped with a gas indication gauge check for adequate pressure prior to switching.
- Prior to any switching turn on the indicating light switch and confirm status and availability of both supplies.
- When leaving the site ensure the indicating light switch is in the ‘OFF’ position.
- Confirm HV switch location and labelling prior to operation.
- If auto operation occurs, to revert to its normal state, it must be switched back manually.

Functions:	Opening, Closing Trans Switch/ CB, Earthing, HV Fuses
Rating:	N/A
Insulant:	SF6
Voltage:	22kV

Manually Paralleling Feeders

1 Place the Control Selector Switch to the ‘Manual’ position.

2 Rotate the Paralleling Selector switch to the ‘Paralleling Operation Enabled’ position.

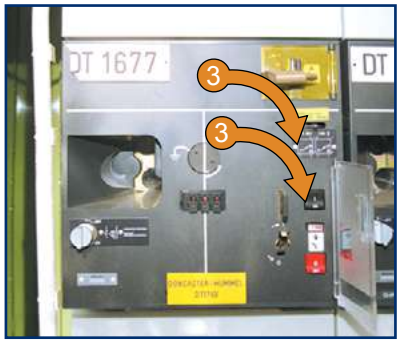


3 CLOSE the appropriate switch as follows:

A. Normal supply switch:
Move and hold the paralleling selector handle left and press the black ‘ON’ button.

OR

B. Standby supply switch:
Move and hold the paralleling selector handle right and press the black ‘ON’ button.



4 Confirm semaphores agree with the HV switch status.

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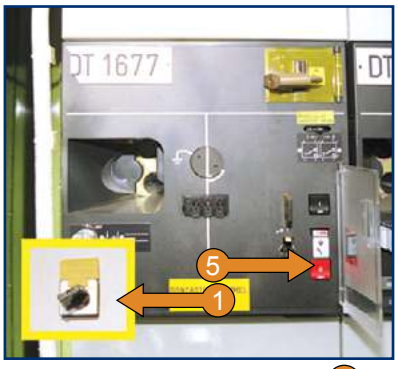
MERLIN GERIN SM6 – AUTO CHANGE OVER (CONTINUED)

Manually Break Feeder Parallel

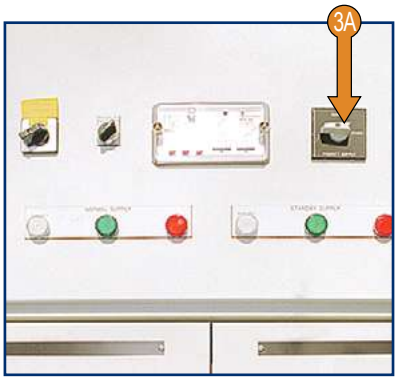
1 Confirm the Control Selector Switch is in the 'Manual' position.

2 **OPEN** the appropriate HV switch by pushing the red 'OFF' button.

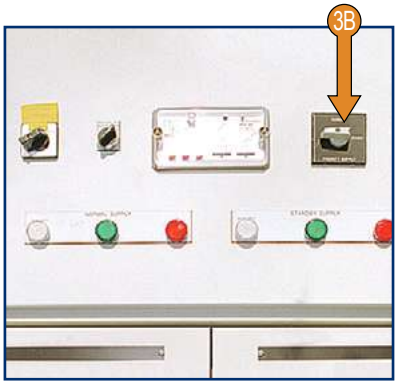


3 Confirm semaphores agree with the HV switch status.

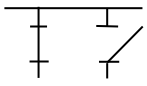
A. If Standby Supply HV switch is to be left open and system configuration is appropriate to enable Auto change Over Scheme:
Confirm / Rotate the priority selector switch to the 'Normal' position.

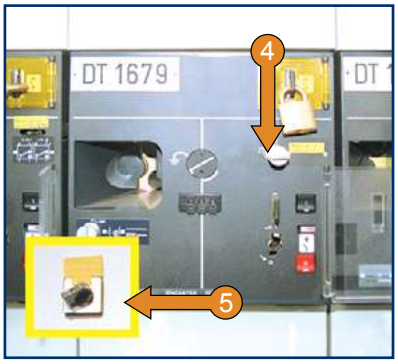


B. If Normal Supply HV switch is to be left open and system configuration is appropriate to enable Auto change Over Scheme:
Confirm / Rotate the priority selector switch to the 'Standby' position (can auto changeover from this position).



4 Rotate the paralleling selector switch to the 'Normal Operation' position -





5 Place the Control Selector Switch to the 'Auto' position

Note: *After auto changeover occurs, switching must be restored manually.*

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MERLIN GERIN VERCORS M6 – AUTO CHANGE OVER

MERLIN GERIN VERCORS M6 – AUTO CHANGE OVER

Prior to any operation:

- If equipped with a gas indicator gauge check for adequate pressure prior to switching.
- Prior to any operation: confirm switch status and availability of both supplies by checking neon indicators on incoming HV cables.
- Confirm HV switch location and labelling prior to operation.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	N/A
Insulant:	SF6
Voltage:	22kV

Manually Paralleling Feeders

1 Rotate the Auto Change Over selector switch to the ‘Manual’ position.

2 Confirm the Isolator Control selector switch is in the ‘Local’ position.

Close the appropriate HV switch as follows:

Note: *Only one of the selector switches shall be operated at any one time.*

A. Electrically:

3 Rotate the appropriate control switch to the ‘Close’ position.

4 Confirm semaphores agree with the HV switch status.

B. Mechanically:

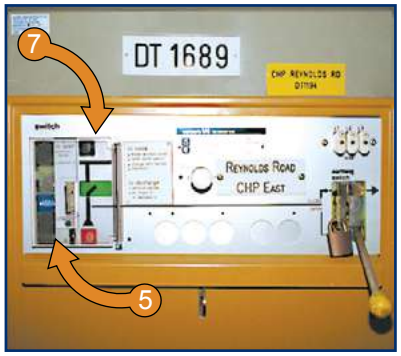
If the spring is NOT charged:

5 OPEN the perspex flap and insert the operating handle into the operating mechanism.

6 Raise the operating handle fully to charge the operating spring.

7 Push the black ‘I’ button to CLOSE the HV switch.

8 Confirm semaphores agree with the HV switch status.



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MERLIN GERIN VERCORS M6 – AUTO CHANGE OVER (CONTINUED)

Manually Break Feeder Parallel

1 Confirm the Auto Change Over selector switch is in the 'Manual' position.

2 Confirm the Isolator Control selector switch is in the 'Local' position.

OPEN the appropriate HV switch as follows:

Note: *Only one of the selector switches shall be operated at any one time.*

A. Electrically:

3 Rotate the appropriate control switch to the 'Trip' position.

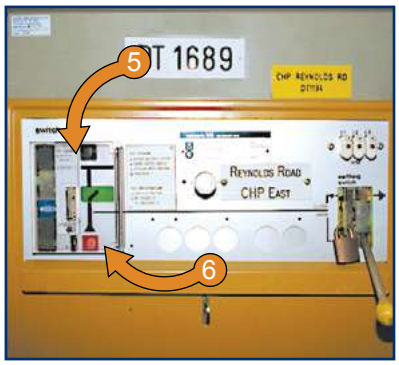
4 Confirm semaphores agree with the HV switch status.

B. Mechanically:

5 Open the perspex flap.

6 Push the red 'O' button to **OPEN** the HV switch.

7 Confirm semaphores agree with the HV switch status.



If system configuration is appropriate to enable Auto Change Over scheme then:

8 Rotate the Auto Change Over selector switch to the 'Auto' position.

For Opening Transformer HV Switch, Closing Transformer HV Switch, Earthing HV Cable and Access to HV Fuses, refer to the Merlin Gerin Vercors M6 template in this manual.

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MERLIN GERIN VERCORS M6

Prior to any operation:

- If equipped with a gas indication gauge check for correct pressure prior to switching.
- Confirm switch location and labelling prior to operation.
- Access Authority required for access to HV fuses.

Functions:	Opening, Closing, Trans Switch/ CB. Earthing, HV Fuses
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV

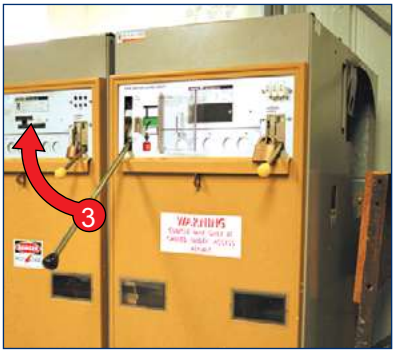
Closing HV Cable / Transformer Switch

1 Open transparent shutter over operating mechanism.

2 Insert operating handle.

3 Raise operating handle to **CLOSE** HV switch.

4 Remove operating handle and confirm semaphore agrees with HV switch status.

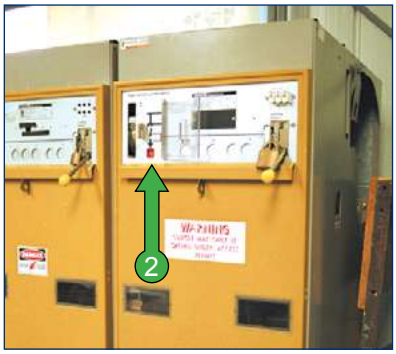


Opening HV Cable / Transformer Switch

1 Open transparent shutter over operating mechanism.

2 Press red open button.

3 Confirm semaphore agrees with switch status



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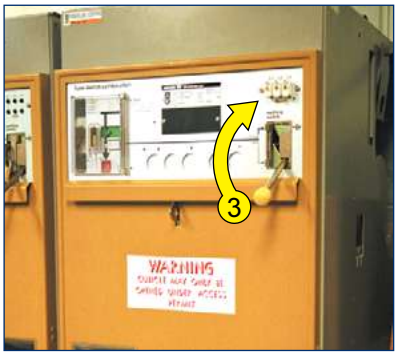
MERLIN GERIN VERCORS M6 (CONTINUED)

Earthing of HV Cable / Transformer

1 Carry out Safe to Earth test.

2 Remove padlock and release earth switch interlock.

3 Raise and push across (to the right) the earth switch handle to **CLOSE** HV earth switch.



Access to HV Fuses

1 With transformer HV earth switch in the closed position remove the HV fuse cover plate to access HV fuses..

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Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the HV switch oil level is correct prior to any operation.
- Confirm the switch location and labelling prior to operating.
- Access Authority required for access to HV fuses.

HV Switch Closed

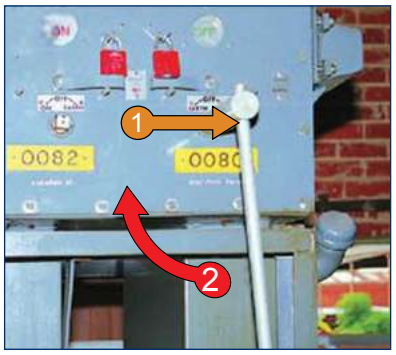
HV Switch Open

Earth Switch Closed

Functions:	Opening, Closing, Trans Switch, HV Fuses
Rating:	400 amps
Insulant:	Oil
Voltage:	11kV, 6.6kV

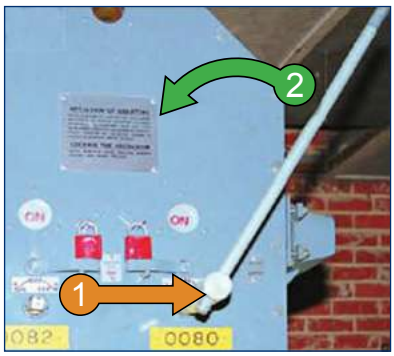
Closing the HV Cable Switch

1. Place the operating handle onto the operating mechanism.
2. Rotate the operating handle in the direction indicated to the stop position to **CLOSE** the HV switch.
3. Remove the operating handle.
4. Confirm the semaphore shows ON.



Opening the HV Cable Switch

1. Place the operating handle onto the operating mechanism.
2. Rotate the operating handle in the direction indicated to the stop position to **OPEN** the HV switch.
3. Remove the operating handle.
4. Confirm the semaphore shows OFF.



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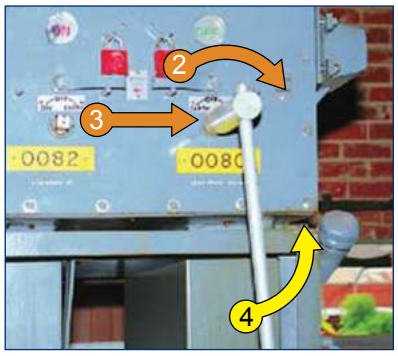
MI RMA (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm relevant the HV switch is open.

2 Remove the padlock and rotate the earth interlock selector from the **'OFF ON'** to the **'OFF EARTH'** position.

3 Place the operating handle onto the operating mechanism.

4 Rotate the operating handle **ACW** to **CLOSE** the HV earth switch.

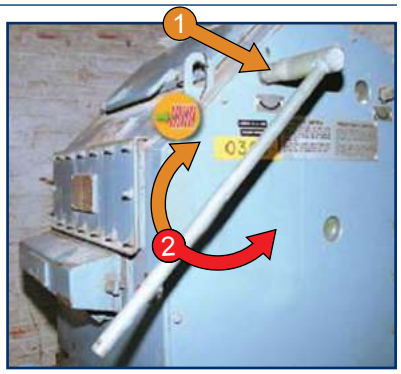
5 Remove the operating handle.

6 Confirm the semaphore shows EARTH.

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

Note: *To ppen the HV Cable Earth Switch, rotate the operating handle clockwise.*

Closing the Transformer HV Switch



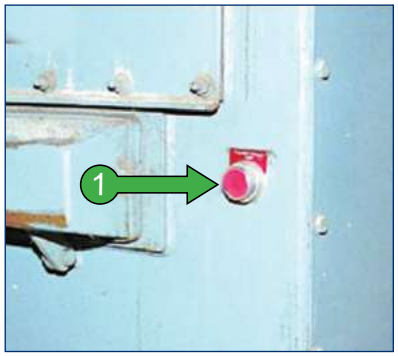
1 Place the operating handle onto the operating mechanism.

2 Rotate the operating handle **CW** ('RESET' direction) to the stop position then rotate the operating handle **ACW** ('ON' direction) to **CLOSE** the transformer HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows ON.

Opening the Transformer HV Switch



1 Press the red 'TRANSFORMER TRIP' button to **OPEN** the transformer HV switch.

2 Confirm the semaphore shows OFF.

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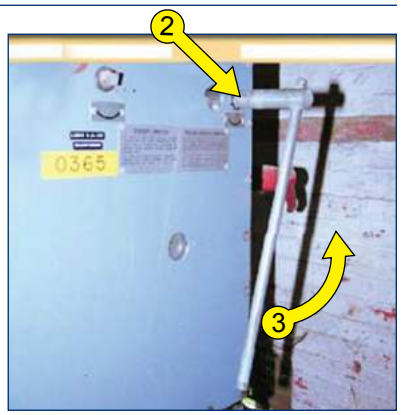
MI RMA (CONTINUED)

Closing the Transformer Earth Switch



1 Confirm the relevant transformer HV switch is open.

2 Place the operating handle onto the earth switch operating mechanism.

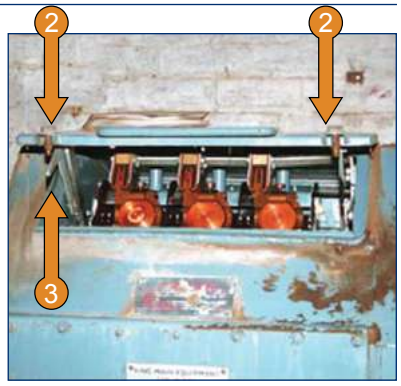
3 Rotate the operating handle **ACW** to **CLOSE** the transformer earth switch.

4 Remove the operating handle.

5 Confirm the semaphore shows EARTH.

Note: *If required perform a 'Safe to Earth' test at the transformer connections.*

Access to the HV Fuses



1 Confirm the transformer earth switch is closed.

2 Unscrew and raise the HV fuse access cover to the first stop position.

3 Release the HV fuse access cover interlock lever and raise the cover firmly to the second stop position to access the HV fuses.

Note: *Raise the access cover firmly to the second stop position to ensure the HV fuse cradle engages with the earthing connections. HV fuses may be hot.*

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Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the HV switch oil level is correct prior to operating.
- Confirm the switch location and labelling prior to operating.
- Note this switchgear is NOT spring assisted. Operation must be a rapid, firm and continuous motion.
- Note this switchgear is not fitted with an earth switch.
- Access Authority required for access to HV fuses.

Functions: Opening, Closing, HV Fuses
Rating: 400 amps
Insulant: Oil
Voltage: 11kV, 6.6kV

HV Switch Open

HV Switch Closed

Closing the HV Cable Switch

1 Rotate the operating handle **CW** in rapid, firm and continuous motion to the stop position to CLOSE the HV switch.

2 Confirm the semaphore shows

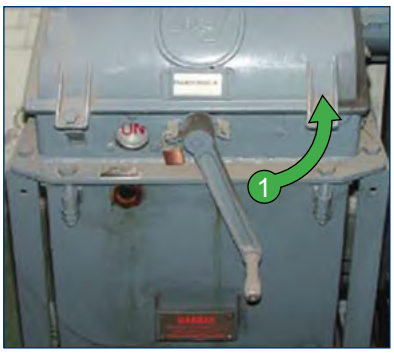
.

Opening the HV Cable Switch

1 Rotate the operating handle **ACW** in a rapid, firm and continuous motion to the stop position to OPEN the HV switch.

2 Confirm the semaphore shows

.



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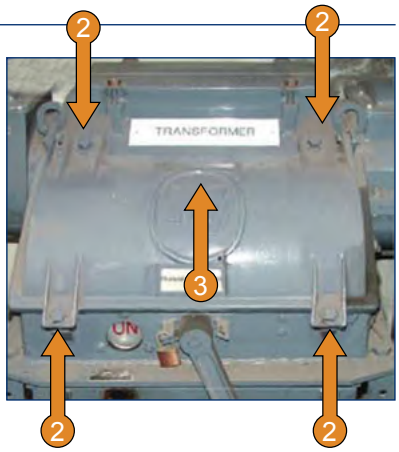
MI/STATOR VL (CONTINUED)

Access to the HV Fuses



1 Confirm the HV switch is open.

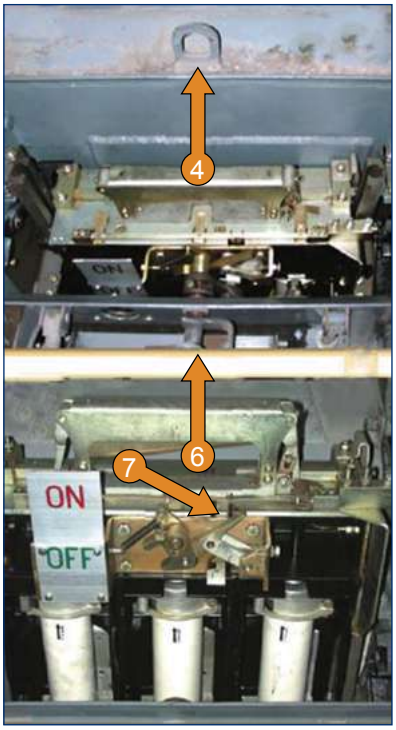
2 Remove the four (4) locking bolts from the HV fuse compartment access cover.

3 Raise the HV fuse access cover.

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

4 Firmly grip the HV fuse carrier handle and lift the HV fuse earner until the latch engages.

Note: *Instructions are attached to the inside of the HV fuse access lid. HV fuses may be hot.*



5 Replace the HV fuse with the striker pins located at the top of the HV fuse.

6 Firmly grip and slightly raise the HV fuse carrier handle, depress the latch located on the front of the carrier, then lower the carrier fully until the latch engages.

7 Reset the tripping mechanism by pressing down the centre tripping latch.

8 Close and secure the HV fuse access cover.

Note: *The HV fuse striker pins must be located on the top of the HV fuse. In some models of this switchgear the tripping mechanism is reset via the main switch operation.*

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M.V. / A.G.E. 6.6KV CAST IRON CB

Prior to any operation:

- This CB must only be operated in a de-energised condition.
- Operation must be a rapid, firm and continuous motion.
- Confirm switch location and labelling prior to operation.
- Note this switchgear is NOT spring assisted.

Functions: Opening, Closing
Rating: 300 amps
Insulant: Oil
Voltage: 6.6kV

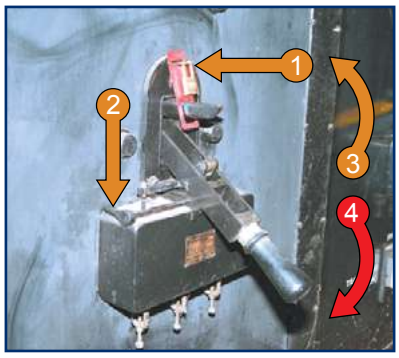
Closing CB

1 Remove driving arm interlock.

2 Release closing handle interlock.

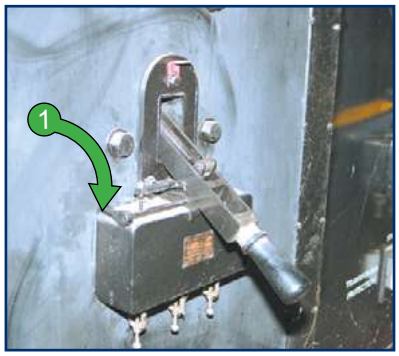
3 Raise closing handle until it engages the driving arm.

4 Push closing handle firmly downwards to CLOSE CB.



Opening CB

1 Press closing handle interlock down to OPEN CB.



M.V. / A.G.E. 6.6KV CAST IRON CB

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MYSCORE VLE

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the HV switch oil level is correct prior to operating.
- This switchgear is NOT spring assisted. Operation must be a rapid, firm and continuous motion.
- Confirm the switch location and labelling prior to operating.
- Access Authority required for access to HV fuses.

HV Switch Open

HV Switch Closed

Functions:	Opening, Closing, Earth Switch, HV Fuses
Rating:	400 amps
Insulant:	Oil
Voltage:	11kV

Closing the HV Cable Switch

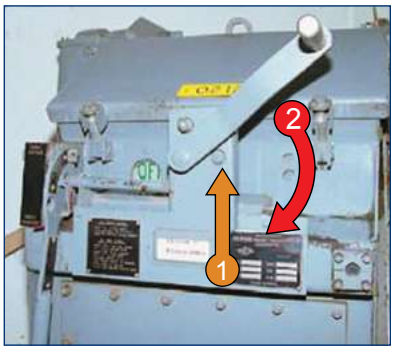
1 Remove the padlock and push in the interlock pin.

2 Rotate the operating handle **CW** in a rapid, firm and continuous motion to the stop position to **CLOSE** the HV switch.

3 Pull out the interlock pin and padlock if required.

4 Confirm the semaphore shows

.



Opening the HV Cable Switch

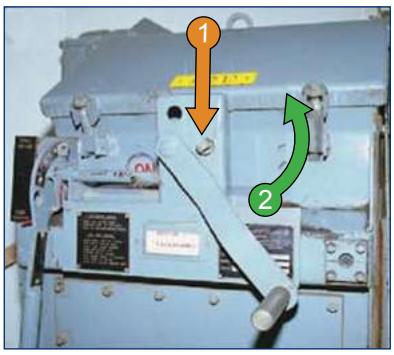
1 Remove the padlock and push in the interlock pin.

2 Rotate the operating handle **ACW** in a rapid, firm and continuous motion to the stop position to **OPEN** the HV switch.

3 Pull out the interlock pin and padlock if required.

4 Confirm the semaphore shows

.



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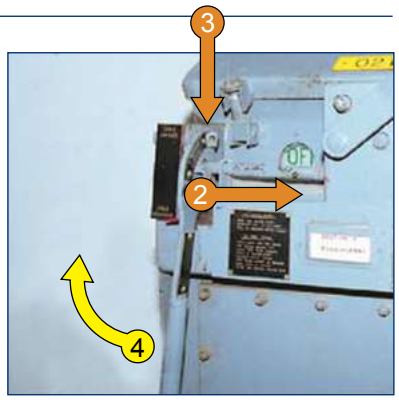
MYSCORE VLE (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm the HV switch is open.

2 Slide the earthing interlock bar across to the right.

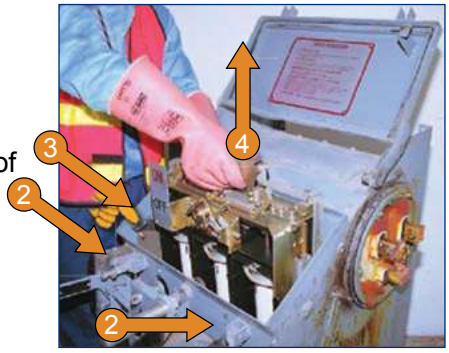
3 Remove the HV earth operating handle interlocking pin.

4 Raise the HV earth operating handle in a rapid, firm and continuous motion to the stop position to **CLOSE** the HV earth switch.

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

Note: *Lower the HV earth operating handle to open the HV earth switch.*

Access to the HV Fuses



1 Confirm the transformer earth switch is closed.

2 Unscrew the two (2) nuts and raise the HV fuse access cover as shown.

3 Grasp and squeeze the release mechanism on the handle of the HV fuse cradle and push down the release lever on the left hand side of the HV fuse cradle.

4 Raise the HV fuse cradle to gain access to the HV fuses.

Note: *When replacing the HV fuse cradle, ensure it is pushed down firmly and the latching mechanisms have operated correctly. HV fuses may be hot.*

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NEBB TYPE RGBC 24

Prior to any operation:

- Ensure HV switchgear is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.
- Access Authority required for access to HV fuses.

HV Switch Open

HV Switch Closed

Functions:	Opening, Closing, Isolation, Trans Switch/CB. Earthing, HV Fuses
Rating:	400 amps
Insulant:	Air
Voltage:	22kV, 11kV

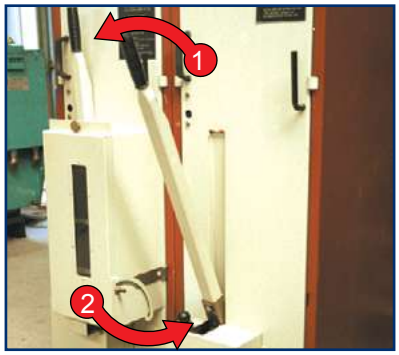
Closing HV Cable / Transformer Switch

1 Charge closing spring by pulling charge handle five (5) times.

2 Close HV switch by pushing operating knob from 'O' to 'I'.

3 Confirm semaphore agrees with switch status

.



Opening HV Cable / Transformer Switch

1 Pull operating knob from 'I' to 'O' to OPEN the HV switch.

2 Confirm semaphore agrees with switch status

.

Note: *Open HV switches shall be left in the isolated position.*

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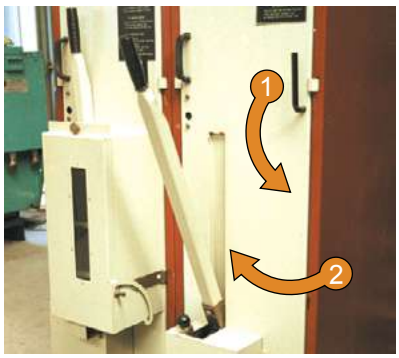
NEBB TYPE RGBC 24 (CONTINUED)

Isolate HV Switch

1 Turn interlock lever 90 degrees **ACW**.

2 Pull HV switch to end stop and release interlock lever.



Restoring HV switch to operating position

1 Turn interlock lever 90 degrees **ACW**.

2 Push HV switch into operating position and release interlock lever.

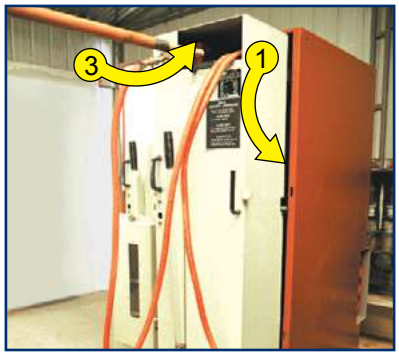
Earthing of HV Cable / Transformer

1 With the HV switch in the isolated position slide the earthing access shutter downwards.

2 Carry out Safe to Earth test.

3 Using appropriate earthing stick attach earth and short circuits.

Note: *Ensure remote end of incoming cable to be earthed is isolated.*



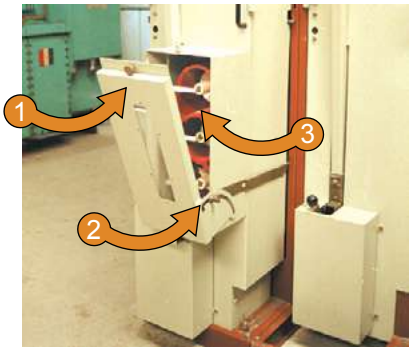
Access to HV Fuses

1 With the transformer HV switch in the isolated position unscrew the HV fuse access cover plate.

2 Release the access cover plate interlock.

3 Remove the HV fuse access cover plate.

Note: *Ensure HV switch is open prior to isolation.*



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NX HV FUSES

Prior to any operation:

- NX type HV fuses can only be removed or replaced with sub station de-energised.
- Ensure operating shotgun stick is secured prior to HV fuse withdrawal.
- Be careful when handling the NX HV fuses as they may be hot.

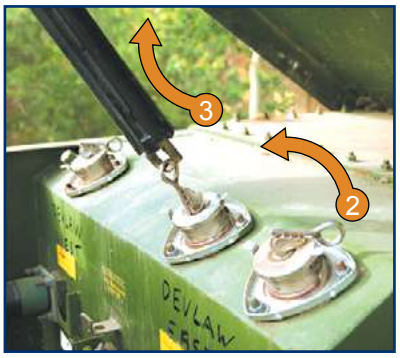
Functions: HV Fuses
Rating: Various
Insulant: N/A
Voltage: 22kV, 11kV

Removal of HV Fuses

1 Attach operating shot-gun stick to HV fuse eye bolt withdrawal mechanism.

2 Where fitted, raise the HV fuse eye bolt to the release position.

3 Pull to withdraw the HV fuse.



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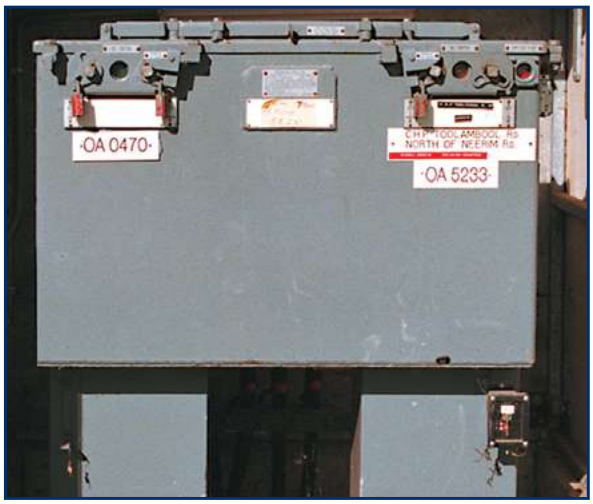
REYROLLE OKSS

Prior to any operation:

- Confirm HV switchgear is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.
- Access Authority required for access to HV fuses.

Functions:	Opening, Closing, Trans Switch/ CB. Earthing, HV Fuses
Rating:	630 amps
Insulant:	Oil
Voltage:	11kV

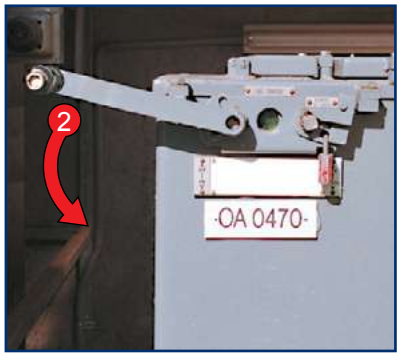


Closing HV Cable Switch

1 Place operating handle onto HV switch operating mechanism.

2 Lower operating handle to **CLOSE** HV switch.

3 Confirm semaphore agrees with switch status.

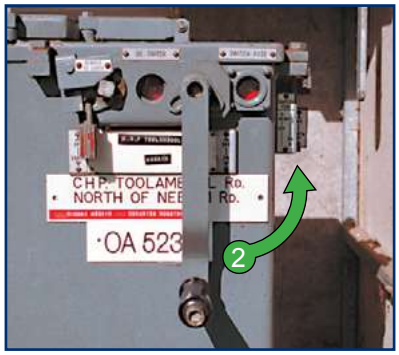


Opening HV Cable Switch

1 Place operating handle onto HV switch operating mechanism.

2 Raise operating handle to **OPEN** HV switch.

3 Confirm semaphore agrees with switch status.



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REYROLLE OKSS (CONTINUED)

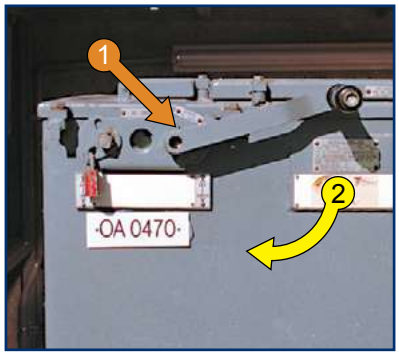
Earthing of HV Cable

1 Lift the HV earth operating mechanism interlock flap and place operating handle onto HV earth switch operating mechanism.

2 Lower operating handle to **EARTH** HV cable.

3 Confirm semaphore agrees with switch status.

Note: *If unable to carry out Safe to Earth test at HV switch unit, do so at remote end of HV cable to be earthed.*

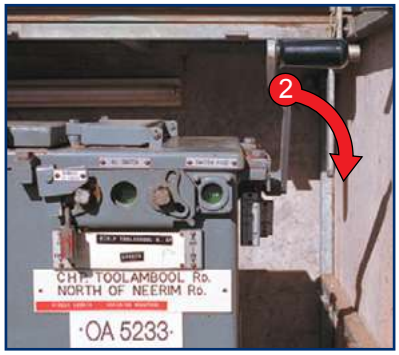


Closing HV Transformer Switch

1 Place operating handle onto transformer HV switch operating mechanism.

2 Lower operating handle to **CLOSE** transformer HV switch.

3 Confirm semaphore agrees with switch status.

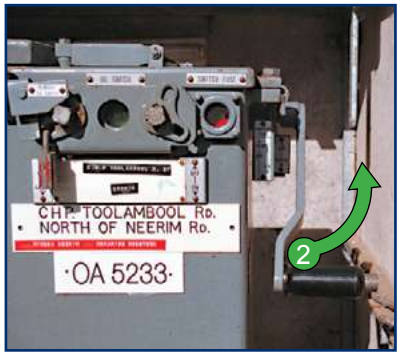


Opening HV Transformer Switch

1 Place operating handle onto transformer HV switch operating mechanism.

2 Raise operating handle to stop position to **OPEN** transformer HV switch and charge closing mechanism.

3 Confirm semaphore agrees with switch status.



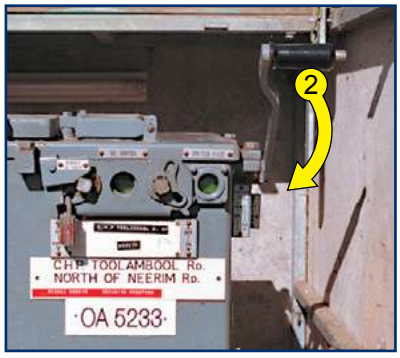
Earthing of Transformer HV Cable

1 Lift the HV earth operating mechanism interlock flap and place operating handle onto transformer HV earth switch operating mechanism.

2 Lower operating handle to **EARTH** transformer HV cable.

3 Confirm semaphore status.

Note: *If unable to carry out Safe to Earth test at HV switch unit do so at transformer LV connections.*



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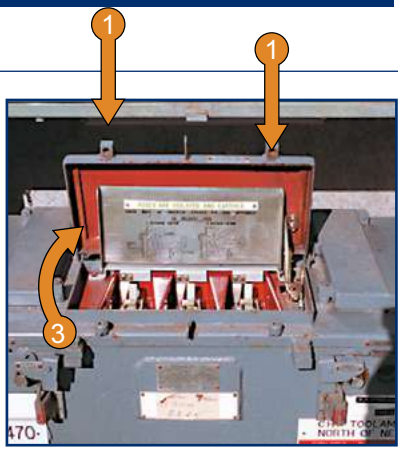
REYROLLE OKSS (CONTINUED)

Access to HV Fuses



1 With transformer HV earth switch closed, unscrew and remove two (2) HV fuse access cover plate bolts.

2 Raise HV fuse access cover plate to stop position.

3 Raise HV fuse access plate to gain access to HV fuses.

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REYROLLE ROK & ROKSS

Prior to any operation:

- Confirm the switch gear is fit for service prior to and after any operation.
- Note the ROK HV switch may exist as a stand alone unit or coupled with other HV switches such as the Reyrolle ROS. The ROKSS unit (see main picture insert) is a 3 way single tank unit which includes one set of HV fuses. Operation of either the ROK or the ROKSS units is the same.
- Confirm the HV switch oil level is correct prior to operating.
- If a 'high pot' test is to be performed on any HV cable attached to this switchgear, the entire unit must be included on the access authority.
- Confirm the switchgear location and labelling prior to operating.
- Access Authority required for access to HV fuses.

Functions:	Open, Closing, Earthing, HV Fuses
Rating:	630 amps
Insulant:	Oil
Voltage:	11kV, 6.6kV

Semaphores

HV Switch Closed | HV Switch Open | Earth Switch Closed

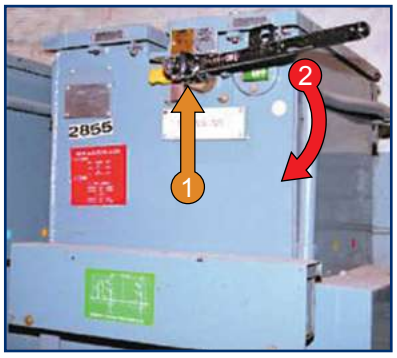
Closing the HV Cable Switch

1 Insert the operating handle into the HV switch operating mechanism with the 'ON' lettering facing the operator.

2 Rotate the operating handle **CW** to the stop position to **CLOSE** the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows ON.



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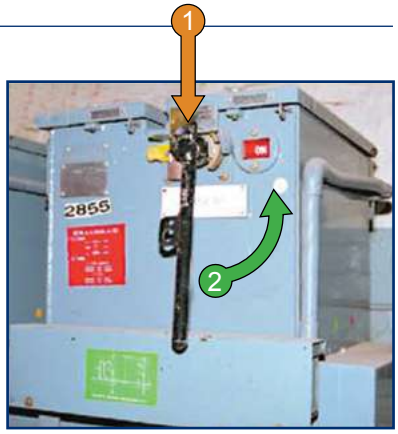
REYROLLE ROK & ROKSS (CONTINUED)

Opening the HV Cable Switch



1 Insert the operating handle into the HV switch operating mechanism with the 'OFF' lettering facing the operator.

2 Rotate the operating handle **ACW** to the stop position to OPEN the HV switch.

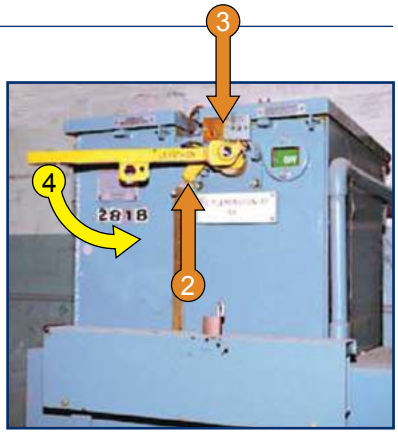
3 Remove the operating handle.

4 Confirm the semaphore shows

.

Note: *Initial movement of operating handle will open the HV switch. Ensure the operating handle is rotated fully to stop position once the HV switch has opened.*

Closing the HV Cable Earth Switch



1 Confirm the relevant HV switch is open.

2 Remove the padlock and lower the earth switch mechanical interlock to the stop position.

3 Insert the yellow operating handle into earth switch operating mechanism with the 'EARTH ON' lettering facing the operator.

4 Rotate the operating handle **ACW** to the stop position to CLOSE the earth switch.

5 Remove the operating handle.

6 Confirm the semaphore shows

.

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

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REYROLLE ROK & ROKSS (CONTINUED)

Opening the HV Cable Earth Switch

1 Insert the yellow operating handle into earth switch operating mechanism with the 'EARTH OFF lettering facing the operator.

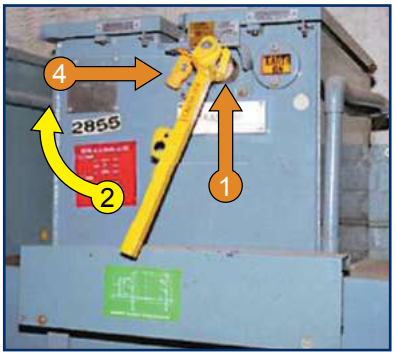
2 Rotate the operating handle **CW** to the stop position to OPEN the earth switch.

3 Remove the operating handle.

4 Raise the earth switch mechanical interlock to the stop position.

5 Confirm the semaphore shows

.



Access to the HV Fuses

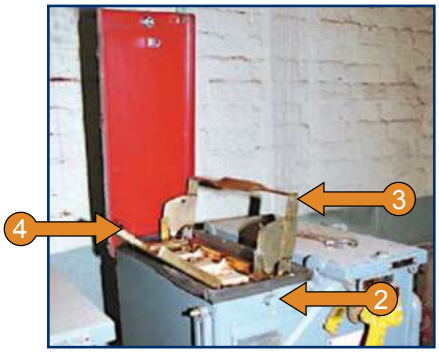
1 Confirm the relevant earth switch is closed.

2 Unscrew the retaining bolt and raise the HV fuse access cover as shown.

3 Raise the HV fuse access lever as shown.

4 Raise the HV fuse cover as shown to gain access to the HV fuses.

Note: *HV fuses may be hot.*



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REYROLLE ROS

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Note the main picture shows a combination of Reyrolle ROS and Reyrolle ROK HV switches. For operation of the Reyrolle ROK HV switch refer to Reyrolle ROK & ROKSS instructions in this manual.
- Confirm the HV switch oil level is correct prior to operating.
- If a 'high pot' test is to be performed on any HV cable attached to this switchgear the entire unit must be included on the access authority.
- Confirm the switch location and labelling prior to operating.
- Access Authority required for access to HV fuses.

Functions:	Opening, Closing, Earthing, Testing
Rating:	630 amps
Insulant:	Oil
Voltage:	11kV, 6.6kV

Semaphores

HV Switch Closed | HV Switch Open | Earth Switch Closed

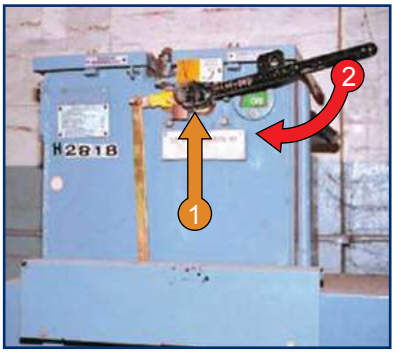
Closing the HV Cable Switch

1 Insert the operating handle into the HV switch operating mechanism with the 'ON' lettering facing the operator.

2 Rotate the operating handle **CW** to the stop position to CLOSE the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows ON.



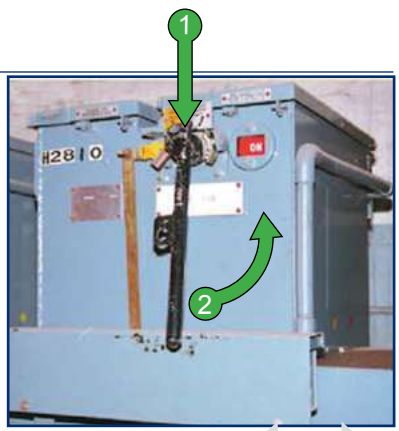
Opening the HV Cable Switch

1 Insert the operating handle into the HV switch operating mechanism with the 'OFF' lettering facing the operator.

2 Rotate the operating handle **ACW** to the stop position to OPEN HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows OFF.



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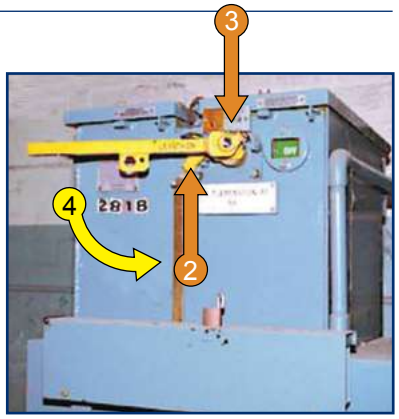
REYROLLE ROS (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm the relevant HV switch is open.

2 Remove the padlock and lower the earth switch mechanical interlock to the stop position.

3 Insert the yellow operating handle into earth switch operating mechanism with the 'EARTH ON' lettering facing the operator.

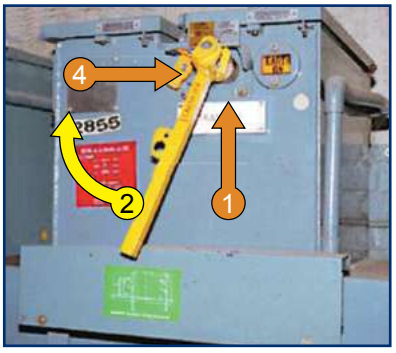
4 Rotate the operating handle **ACW** to the stop position to CLOSE the earth switch.

5 Remove the operating handle.

6 Confirm the semaphore shows

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

Opening the HV Cable Earth Switch



1 Insert the yellow operating handle into earth switch operating mechanism with the 'EARTH OFF lettering facing the operator.

2 Rotate the operating handle **CW** to the stop position to OPEN the earth switch.

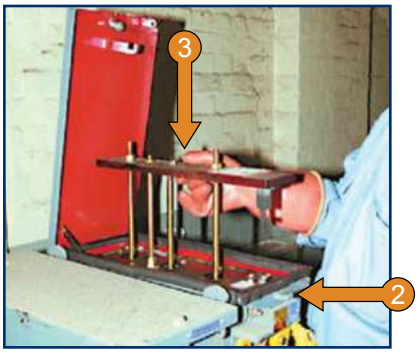
3 Remove the operating handle.

4 Raise the earth switch mechanical interlock to the stop position.

5 Confirm the semaphore shows

.

Access to the Test Terminals



1 Confirm the relevant earth switch is closed.

2 Unscrew the retaining bolt and raise the test probe access cover as shown.

3 Place the test probe assembly into position and lower to the stop position.

4 Attach test equipment as required.

5 Open the HV earth switch and perform required tests.

Note:

- *Ensure the probe assembly is pushed firmly into position to engage the earth switch interlock.*
- *The earth switch must be closed to allow removal of the probe assembly.*

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ROTARY T-BLADE

Prior to any operation:

- Four (4) position switch can be operated **CW** or **ACW** as required.
- DO NOT reverse rotation part way through switch operation.
- For removal of transformer HV fuses refer to 'NX HV Fuses' section of the manual.
- Incorrect direction of any rotation may result in supply interruption.

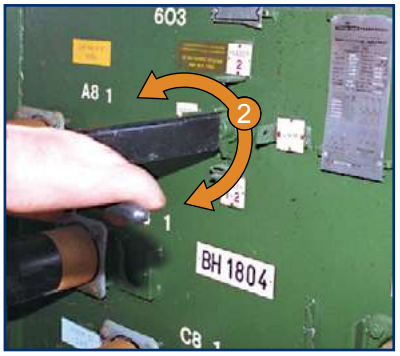
Functions:	Opening, Closing, HV Fuses
Rating:	400 amps
Insulant:	Oil
Voltage:	22kV

HV Switch Operation

1 Attach operating shot-gun stick / operating handle to HV switch operating mechanism.

2 Rotate shot-gun stick / operating handle to required position.

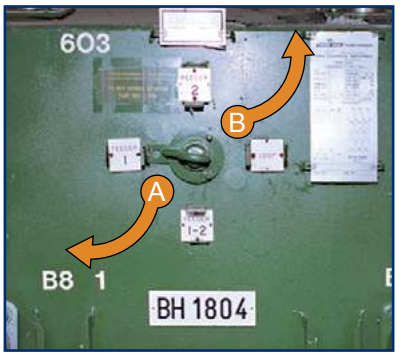
3 Confirm pointer agrees with switch status.



Transformer Supplied from Circuit 'A'

1 When the HV switch is in this position the transformer is supplied from HV circuit 'A'.

2 HV circuit 'B' is separated from both the transformer and HV circuit 'A'.



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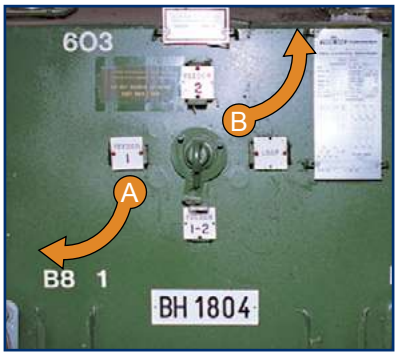
ROTARY T-BLADE (CONTINUED)

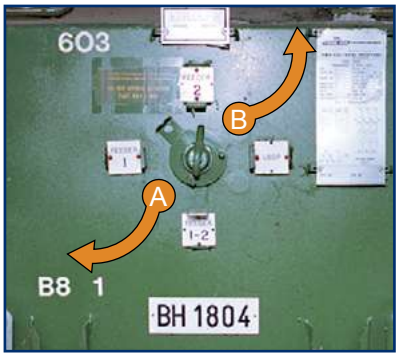
Transformer Supplied from Circuit 'A' & 'B'

1 When the HV switch is in this position both HV circuit 'A' and 'B' are tied and supplying the transformer.



Transformer Supplied from Circuit 'B'

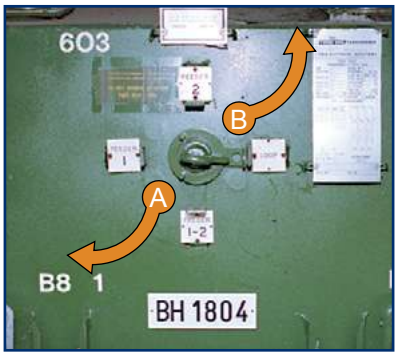
1 When the HV switch is in this position the transformer is supplied from HV circuit 'B'.
HV circuit 'A' is separated from both the transformer and HV circuit 'B'.



Transformer Isolated on the HV Side

1 When the HV switch is in this position the transformer is isolated on the HV side.

2 Circuits 'A' and 'B' are connected together.



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ROTARY V-BLADE

Prior to any operation:

- Four (4) position switch can be operated **CW** or **ACW** as required.
- DO NOT reverse rotation part way through switch operation.
- For removal of transformer HV fuses refer to 'NX HV Fuses' section of the manual.
- Incorrect direction of rotation may result in supply interruption.

Functions:	Opening, Closing, HV Fuses
Rating:	300 amps
Insulant:	Oil
Voltage:	22kV, 11kV

HV Switch Operation

1 Attach operating shot-gun stick / operating handle to HV switch operating mechanism.

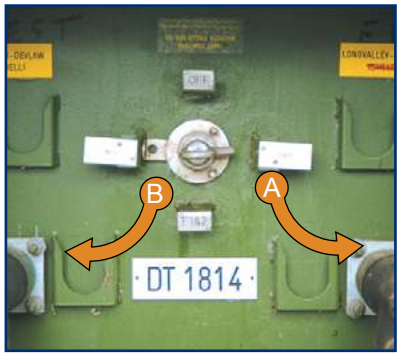
2 Rotate shot-gun stick / operating handle to required position.

3 Confirm pointer agrees with switch status.

Transformer Supplied from Circuit 'A'

1 When the HV switch is in this position the transformer is supplied from HV circuit 'A'.

2 HV circuit 'B' is separated from both the transformer and HV circuit 'A'



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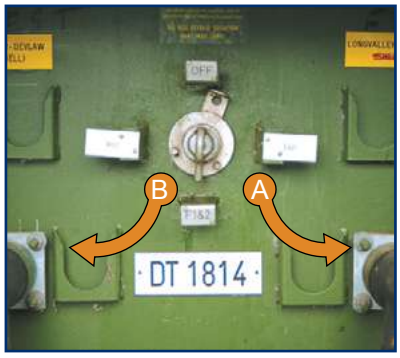
ROTARY V-BLADE (CONTINUED)

Transformer Supplied from Circuit 'A' & 'B'

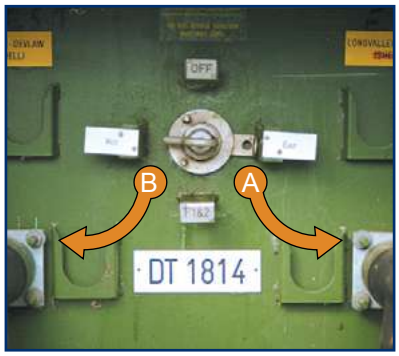
1 When the HV switch is in this position both HV circuit 'A' and 'B' are tied and supplying the transformer.



Transformer Supplied from Circuit 'B'

1 When the HV switch is in this position the transformer is supplied from HV circuit 'B'.

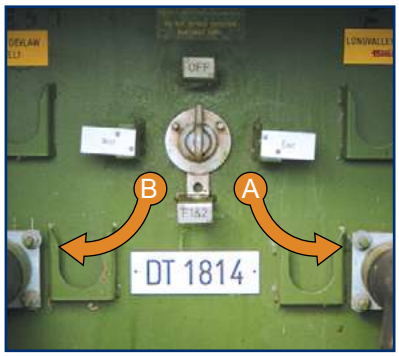
2 HV circuit 'A' is separated from both the transformer and HV circuit 'B'.



Transformer Isolated on the HV Side

1 When the HV switch is in this position the transformer is isolated on the HV side.

2 Separation is also maintained between HV circuits 'A' and 'B'.



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S&C GEAR MARK II KIOSK SUBSTATION

Prior to any operation:

- Ensure yellow operating restriction device is correctly positioned before and after HV switch operation.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	400 amps
Insulant:	Air
Voltage:	22kV

Closing HV Cable Switch

1 Remove yellow operating restriction device.

2 Place operating handle on operating shaft.

3 Rotate operating handle **CW** to CLOSE HV switch.

4 Confirm pointer agrees with HV switch status.

5 Replace yellow operating restriction device.

Opening HV Cable Switch

1 Remove yellow operating restriction device.

2 Place operating handle on operating shaft.

3 Rotate operating handle **ACW** to OPEN HV switch.

4 Confirm pointeragrees with HV switch status.

5 Replace yellow operating restriction device.

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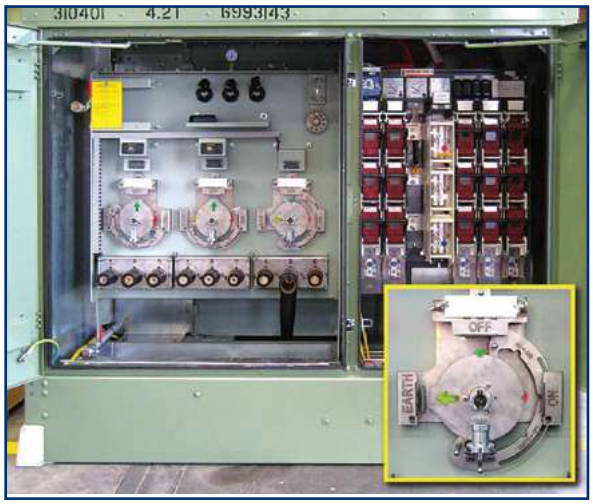
SCHNEIDER KIOSK SUBSTATION

Prior to any operation:

- These kiosk substations can come in one, two or three HV switch combinations.
- Check the oil level prior to switching and/or removal of the HV bayonet fuses.
- Confirm the transformer tank pressure via the indication gauge and equalise via the bleed valve prior to removal of the HV bayonet fuses.
- Refer to the WILSON KIOSK SUBSTATION template in this manual for instructions on the removal/ replacement of the HV bayonet fuses.
- Confirm the HV switch location and labelling prior to operation.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	Various
Insulant:	Oil
Voltage:	22 kV



Closing the HV Cable Switch

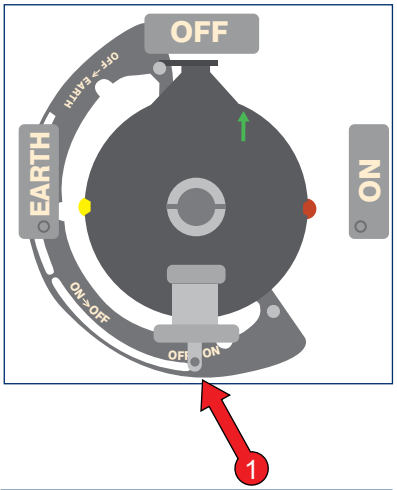
1 Raise the interlock pin and rotate the interlock plate **CW** until the 'OFF → ON' cut out aligns with the interlock pin as shown. Release the interlock pin.

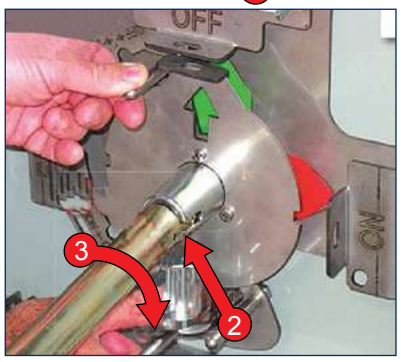
2 Insert the operating handle into the operating mechanism.

3 Rotate the operating handle **CW** app. 135 degrees to the stop position (interlock plate pin) to **CLOSE** the HV switch. Remove the operating handle.

4 Confirm the HV switch has closed correctly via the operating mechanism disc arrow pointing to the 'ON' position with a red background visible.

Note: *Ensure the interlock plate is in the correct position prior to operating.*





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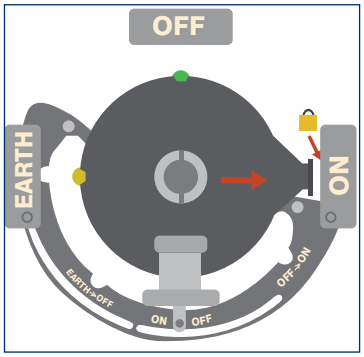
SCHNEIDER KIOSK SUBSTATION (CONTINUED)

Locking the HV Switch in the Closed Position

If required, place a padlock on the operating mechanism disc in the position as shown to lock the HV switch in the closed position.

Note: *Confirm the HV switch location and labelling prior to locking.*



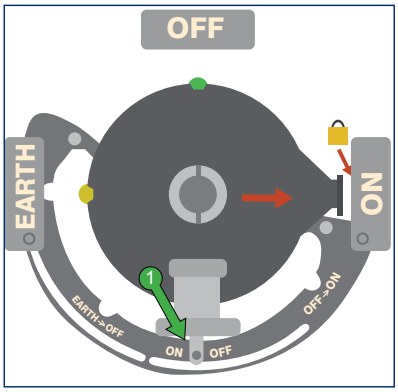
Opening the HV Cable Switch

1 Raise the interlock pin and rotate the interlock plate **ACW** until the 'ON → OFF' cut out aligns with the interlock pin as shown. Release the interlock pin.

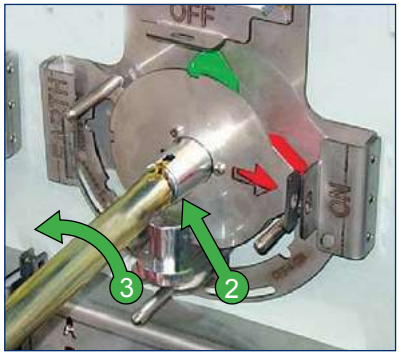
2 Insert the operating handle into the operating mechanism.

3 Rotate the operating handle **ACW** app. 135 degrees to the stop position (interlock plate pin) to OPEN the HV switch. Remove the operating handle.

4 Confirm the HV switch has closed correctly via the operating mechanism disc arrow pointing to the 'OFF' position with a green background visible.

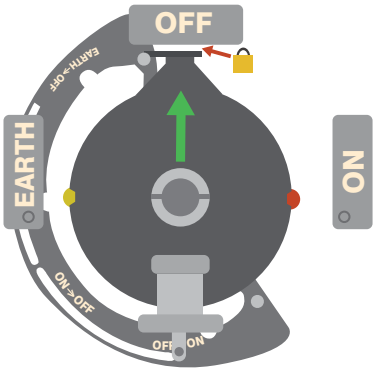


Note: *Ensure the interlock plate is in the correct position prior to operating.*



Locking the HV Switch in the Open Position

If required, place a padlock on the operating mechanism disc in the position as shown to lock the HV switch in the opened position.



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SCHNEIDER KIOSK SUBSTATION (CONTINUED)

Closing the HV Cable Earth Switch

1 Confirm the relevant HV switch is open.

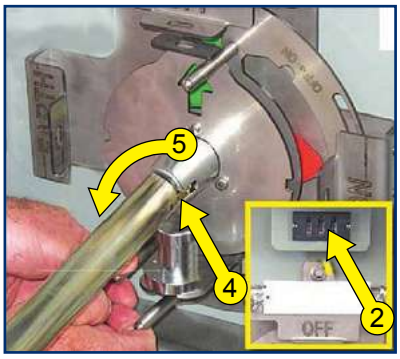
2 Confirm the 'Safe To Earth' neon indicators are not illuminated.

3 Raise the interlock pin and rotate the interlock plate **CW** until the 'OFF → EARTH' cut out aligns with the interlock pin as shown. Release the interlock pin.

4 Insert the operating handle into the operating mechanism.

5 Rotate the operating handle **ACW** app. 135 degrees to the stop position (interlock plate pin) to **CLOSE** the HV earth switch. Remove the operating handle.

6 Confirm the HV earth switch has closed correctly via the operating mechanism disc arrow pointing to the 'EARTH' position with a yellow background visible.

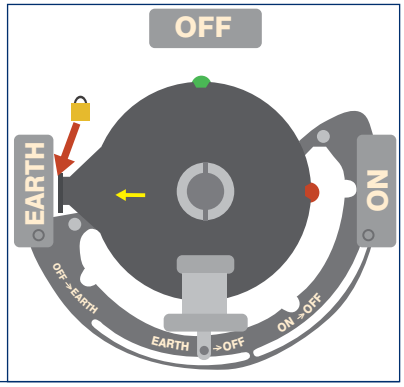


Note: *Confirm the HV earth switch location and labelling prior to earthing.*

Confirm the remote end of the HV cable is isolated prior to earthing.

Locking the Earth Switch in the closed Position

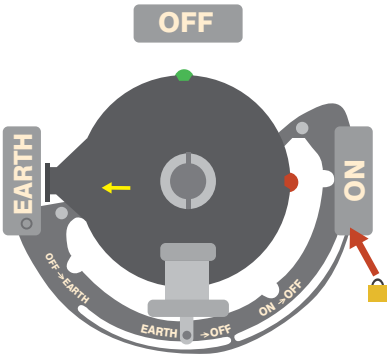
If required, place a padlock on the operating mechanism disc in the position as shown to lock the HV earth switch in the closed position.



Locking Off the Operation of the HV Cable Switch

1 Confirm the interlock plate is in the 'OFF → EARTH' or 'EARTH → OFF' position (as shown).

2 Attach the padlock through the 'ON' indication plate and the interlock ring as shown. Note: When locked in this position the interlock ring can be rotated to allow opening and closing of the earth switch but cannot be rotated to allow operation of the HV cable switch.



Note: *When locked in this position the earth switch can be opened I closed. The HV cable switch cannot be operated.*

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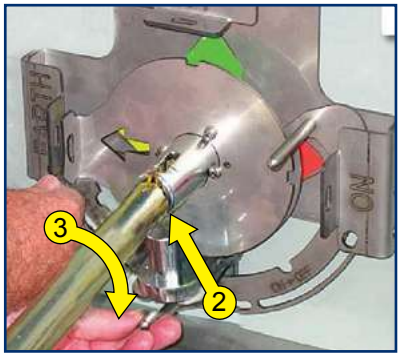
SCHNEIDER KIOSK SUBSTATION (CONTINUED)

Opening the HV Cable Earth Switch



1 Raise the interlock pin and rotate the interlock plate **CW** until the 'EARTH → OFF' cut out aligns with the interlock pin as shown. Release the interlock pin.

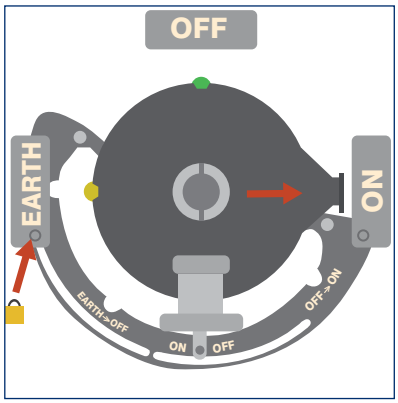
2 Insert the operating handle into the operating mechanism.

3 Rotate the operating handle **CW** app. 135 degrees to the stop position (interlock plate pin) to OPEN the HV earth switch. Remove the operating handle.

4 Confirm the HV earth switch has opened correctly via the operating mechanism disc arrow pointing to the 'OFF' position with a green background visible.

Note: *Ensure the interlock plate is in the correct position prior to operating.*

Locking off Operation of the HV Earth Switch



1 Confirm the interlock plate is in the 'OFF → ON' or 'ON → OFF' position (as shown).

2 Attach the padlock through the 'EARTH' indication plate and the interlock ring as shown. Note: When locked in this position the interlock ring can be rotated to allow opening and closing of the HV cable switch but cannot be rotated to allow operation of the HV earth switch.

Note: *When locked in this position the HV cable switch can be opened I closed. The HV earth switch cannot be operated.*

Removal/Replacement of the HV Bayonet fuses

Refer to the:WILSON KIOSK SUBSTATION template in this manual for detailed instructions on the removal and replacement of the HV bayonet fuses as used with this switchgear.

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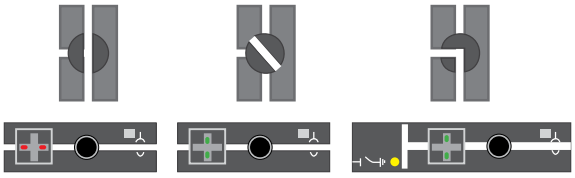
SCHNEIDER RM6 – TALUS EASERGY T200 REMOTE CONTROL - 11KV

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the correct SF6 gas pressure prior to any operation. Refer to the Schneider / Merlin Gerin SF6 Gas Pressure Gauge template for instructions if required.
- Remote operation is always the preferred method. Some units are equipped with 'Auto Change-over' functions. If fitted this function must be displayed prior to any local operation.
- The remote operation function must be disabled before any local operation can take place.
- Remote operated switches are defined by the symbol .
- Confirm the HV switch location and labelling prior to operation.

Functions:	Opening, Closing, Transformers, HV Fuses
Rating:	630 amps
Insulant:	SF6
Voltage:	11kV

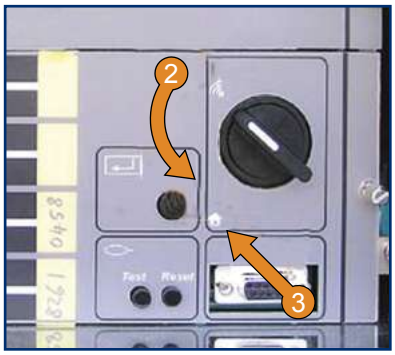


Suppressing the HV Switch Remote Control

1 Slide open the remote control operating panel perspex access cover.

2 Rotate the Control Switch **ACW** to the position.

3 Confirm the **red** LED illuminates.



Restoring the HV Switch Remote Control

1 Rotate the Control Switch **CW** to the position.

2 Confirm the green LED illuminates.

3 Close operating panel Perspex access cover.

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SCHNEIDER RM6 – TALUS EASERGY T200 REMOTE CONTROL (CONTINUED)

Closing the HV Switch – Local Electrical

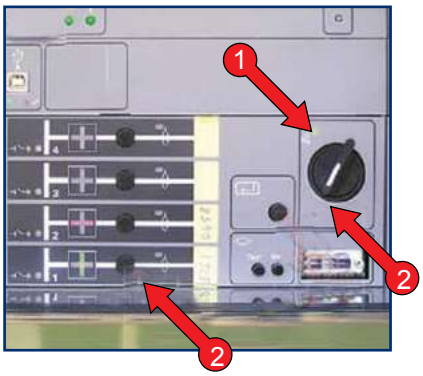
1 Confirm the HV switch remote control is suppressed.

2 Simultaneously press the button and the relevant HV switch button to **CLOSE** the HV switch.

3 Confirm the control panel semaphore shows .

4 Confirm the HV switch semaphore shows .

5 If required, restore the HV switch remote control.



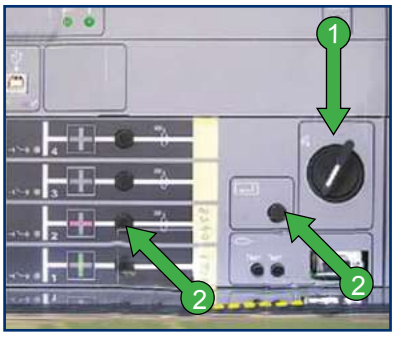
Opening the HV Switch – Local Electrical

1 Confirm the HV switch remote control is suppressed.

2 Simultaneously press the button and the relevant HV switch button to open the HV switch.

3 Confirm the control panel semaphore shows .

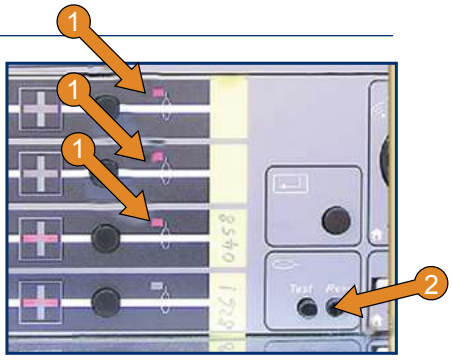
4 Confirm the HV switch semaphore shows .



Fault Indication - Resetting

1 Red LED(s) will illuminate as shown if fault current is detected.

2 Press the 'RESET' button to reset the fault indication LED(s).



Closing the HV Switch – Manually

For all manual operatiosn – If the HV switch can be remotely operated the Control must be suppressed prior to any manual operation.

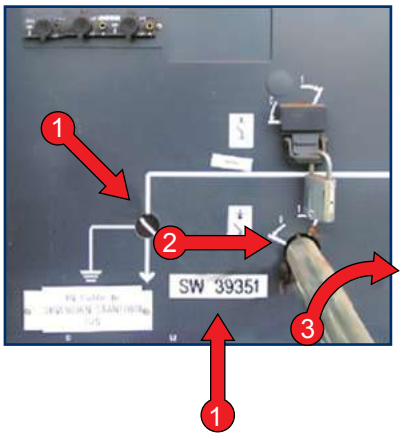
1 Confirm the HV switch is open and switching no. is correct

2 Open the access cover and insert the operating handle into the operating mechanism as shown.

3 Rotate the operating handle **CW** to the stop position to **CLOSE** the HV switch.

4 Remove the operating handle and close the access cover.

5 Confirm the semaphore shows .



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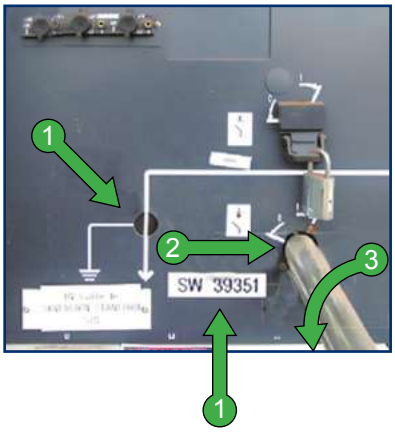
SCHNEIDER RM6 – TALUS EASERGY T200 REMOTE CONTROL (CONTINUED)

Opening the HV Switch – Manually

Note: *For all manual operations – If the HV switch can be remotely operated, the Control must be suppressed prior to any manual operation.*



1 Confirm HV switch is closed and switching no. is correct.

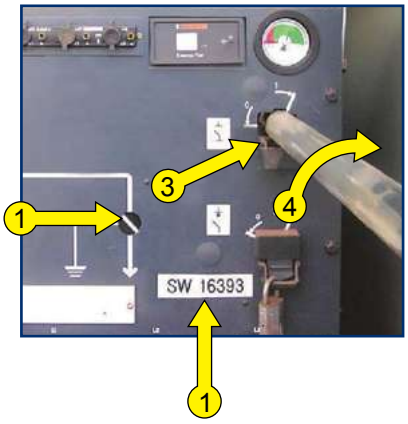
2 Open the access cover and insert the operating handle into the operating mechanism as shown.

3 Rotate the operating handle **ACW** to the stop position to open the HV switch.

4 Remove the operating handle and close the access cover.

5 Confirm the semaphores shows .

Closing the Earth Switch



1 Confirm the relevant HV switch is open and switch no. is correct

2 Perform a 'Safe to Earth' test.

3 Unlock and open the access cover and insert the operating handle into the earth switch operating mechanism as shown.

4 Rotate the operating handle **CW** to the stop position to **CLOSE** the earth switch.

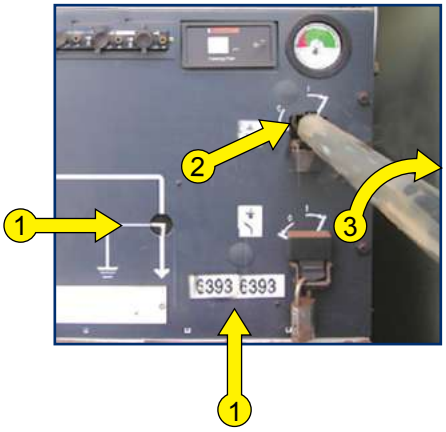
5 Remove the operating handle.

6 Confirm the semaphore shows .

7 Confirm the relevant earth switch LED on the local control panel illuminates.

Note: *Confirm the remote end of the HV cable is isolated prior to earthing.*

Opening the Earth Switch



1 Confirm HV earth switch is closed and switch no. is correct.

2 Open the access cover and insert the operating handle into the earth switch operating mechanism as shown.

3 Rotate the operating handle **ACW** to the stop position to open the earth switch.

4 Remove the operating handle.

5 Close and padlock the earth switch operating mechanism access cover.

6 Confirm the semaphore shows .

7 Confirm the relevant earth switch LED on the local control panel is OFF.

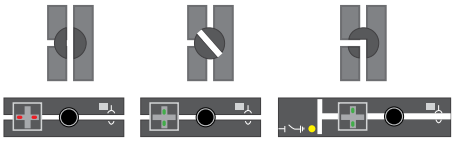
VESI Switchgear Manual – February 2018 Copyright © 2018

SCHNEIDER RM6 - TALUS EASERGY T200 REMOTE CONTROL – 22KV

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Remote operation is always the preferred method of operation. Some switchgear units are equipped with 'Auto Change-over' functions.
- The remote operation function must be disabled before any local operation can take place.
- Remotely operated switches are defined by the symbol .
- Confirm the gas switch location and labelling prior to any operation.
- Do not operate the switchgear if the SF6 gas pressure indicator points to the red zone.
- Check/Confirm gas pressure, labelling and semaphores.
- If fitted, remote operation is always the preferred method.

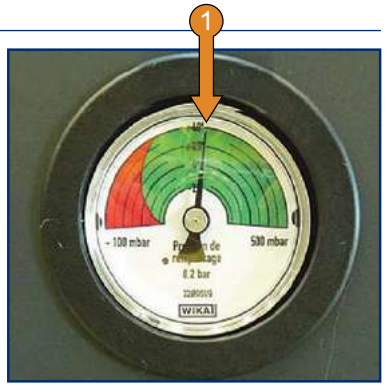
Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	630 Amps
Insulant:	SF6
Voltage:	22kV



Switch Closed | Switch Open | Earth Switch Closed

Confirming the Correct SF6 Gas Pressure

1 Confirm the SF6 gas pressure is correct - indicator pointing to the green zone - prior to and after any operation.

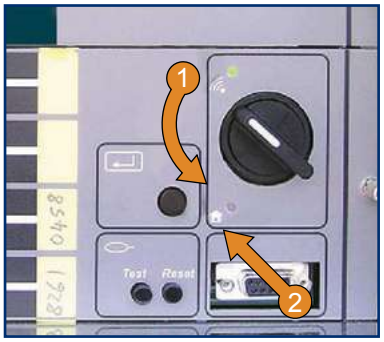


Suppressing the HV Switch Remote Control

1 Slide open the remote control operating panel perspex access cover.

2 Rotate the Control Switch **ACW** to the .

3 Confirm the red LED illuminates.



Restoring the HV Switch Remote Control

1 Rotate the Control Switch to the position.

2 Confirm the green LED illuminates .

3 Close operating perspex access cover.

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SCHNEIDER RM6 - TALUS EASERGY T200 REMOTE CONTROL (CONTINUED)

Closing the HV Switch - Local Electrical

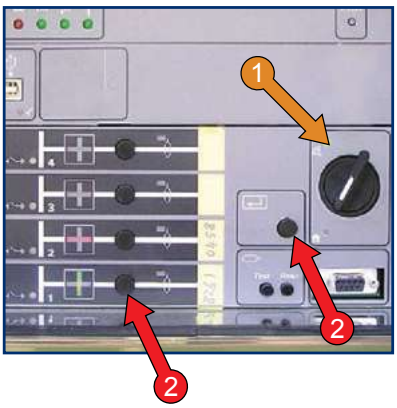
1 Confirm the HV switch remote control is suppressed.

2 Simultaneously press the and the relevant HV switch button to **CLOSE** the HV switch.

3 Confirm the control panel semaphore shows .

4 Confirm the HV switch semaphore shows .

5 If required, restore the HV switch remote control.



Opening the HV Switch - Local Electrical

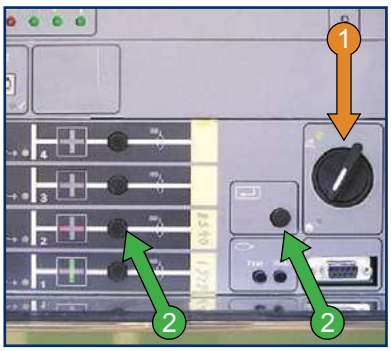
1 Confirm the HV switch remote control is suppressed.

2 Simultaneously press the button and the relevant HV switch button to **OPEN** the HV switch.

3 Confirm the control panel semaphore shows .

4 Confirm the HV switch semaphore shows .

5 If required, restore the HV switch remote control.



Closing the HV Switch – Manually

1 Confirm HV switch is open and the switching no. is correct.

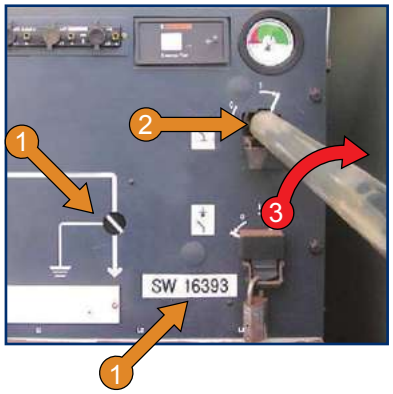
2 Open the access cover and insert the operating handle into the operating mechanism as shown.

3 Rotate the operating handle **CW** to the stop position to **CLOSE** the HV switch.

4 Remove the operating handle and close the access cover.

5 Confirm the semaphore shows .

Note: *For all manual operations – If the HV switch can be remotely operated, the Remote Control must be suppressed prior to any manual operation.*



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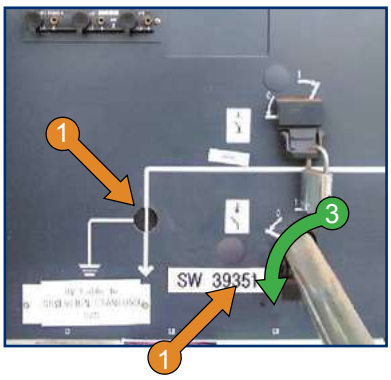
SCHNEIDER RM6 - TALUS EASERGY T200 REMOTE CONTROL (CONTINUED)

Opening the HV Switch – Manually



Note: *For all manual operations - If the HV switch can be remotely operated, the Remote Control must be suppressed prior to any manual operation.*

1 Confirm the relevant HV switch is open and switching no. is correct.

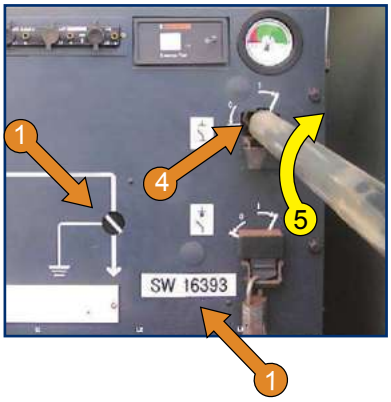
2 Confirm the HV switch is closed and switching no. is correct. Open the access cover and insert the operating handle into the operating mechanism as shown.

3 Rotate the operating handle **ACW** to the stop position to OPEN the HV switch.

4 Remove the operating handle and close the access cover.

5 Confirm the semaphore shows .

Closing the Earth Switch



Note: *For all manual operations - If the HV switch can be remotely operated, the Remote Control must be suppressed prior to any manual operation.*

1 Confirm the relevant HV switch is open and switching no. is correct.

2 Confirm the relevant HV switch is open and switch no. is correct.

3 Perform a 'Safe to Earth' test.

4 Unlock and open the access cover and insert the operating handle into the earth switch operating mechanism as shown.

5 Rotate the operating handle CW to the stop position to close the earth switch.

6 Remove the operating handle.

7 Confirm the semaphore shows

Note: *Confirm the remote end of the HV cable is isolated prior to earthing.*

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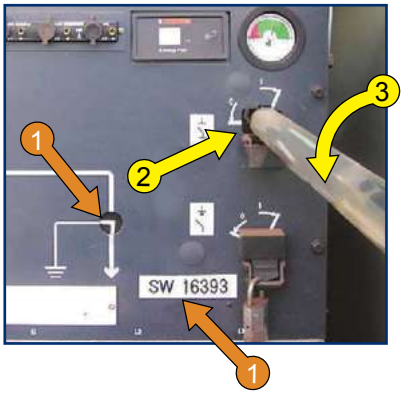
SCHNEIDER RM6 - TALUS EASERGY T200 REMOTE CONTROL (CONTINUED)

Opening the Earth Switch

Note: *For all manual operations - If the HV switch can be remotely operated, the Remote Control must be suppressed prior to any manual operation.*



1 Confirm the earth switch is closed.

2 Open the access cover and insert the operating handle into the earth switch operating mechanism as shown.

3 Rotate the operating handle **ACW** to the stop position to OPEN the earth switch.

4 Remove the operating handle.

5 Close and padlock the earth switch operating mechanism access cover.

6 Confirm the semaphore shows .

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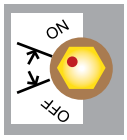
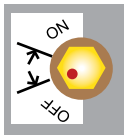
SIEMENS 3C TYPE 1

Prior to any operation:

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the switch location and labelling prior to operating.
- Access Authority required for access to HV fuses.

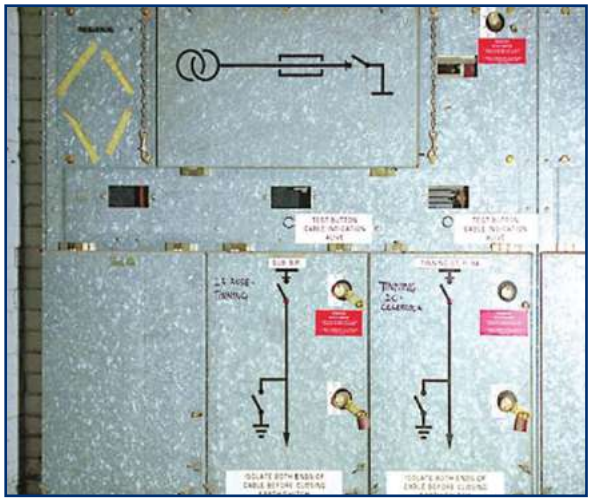


HV Switch / Earth Switch Closed



HV Switch / Earth Switch Open

Functions:	Opening, Closing, Earthing, HV Fuses
Rating:	400 amps
Insulant:	Air
Voltage:	11kV, 6.6kV



Closing the HV Cable Switch

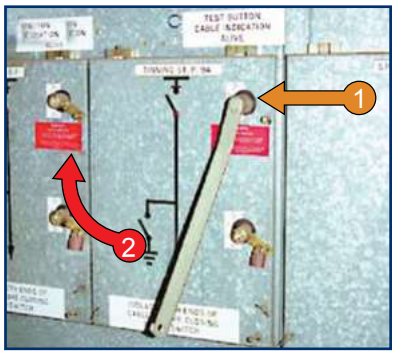
1 Place the operating handle onto the operating mechanism as shown.

2 Rotate the operating handle **CW** to CLOSE HV switch.

3 Remove the operating handle.

4 Confirm the **red** indicator dot on operating mechanism points to the 'ON' position.

5 Visually confirm the HV switch status via the viewing window.



Opening the HV Cable Switch

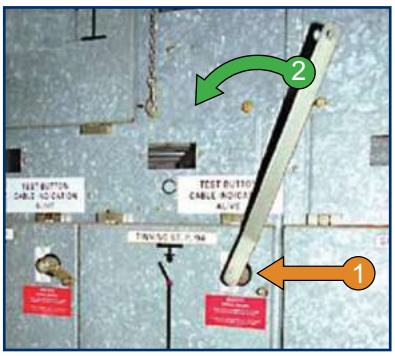
1 Place the operating handle onto the operating mechanism as shown.

2 Rotate the operating handle **ACW** to OPEN HV switch.

3 Remove the operating handle.

4 Confirm the **red** Indicator dot on operating mechanism points to the 'OFF' position.

5 Visually confirm the HV switch status via the viewing window.



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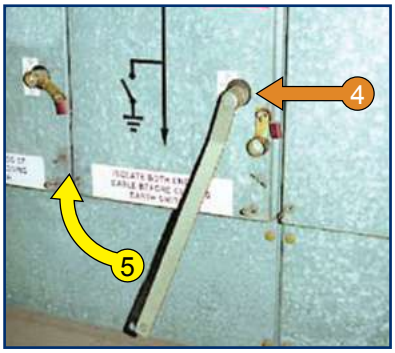
SIEMENS 3C TYPE 1 (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm the relevant HV switch is open.

2 Perform a 'Safe to Earth' test.

3 Unlock the padlock and remove the HV earth switch interlock device.

4 Place the operating handle onto the HV earth operating mechanism.

5 Rotate the operating handle **CW** to CLOSE the HV earth switch.

6 Remove the operating handle.

7 Confirm the **red** indicator dot on the operating mechanism indicates 'EARTH' position.

Note: *Ensure the remote end of HV Cable is isolated prior to earthing.*
Visually confirm the earth switch status via the viewing window.

Opening the HV Cable Earth Switch

1 Unlock the padlock and remove the HV earth switch interlock device.

2 Place the operating handle onto the HV earth operating mechanism as shown.

3 Rotate the operating handle **ACW** to OPEN the HV earth switch.

4 Remove the operating handle.

5 Confirm the **red** indicator dot on the operating mechanism indicates 'OFF position.

6 Visually confirm the earth switch status via the viewing window.

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SIEMENS 3C TYPE 1 (CONTINUED)

Access to the HV Fuses

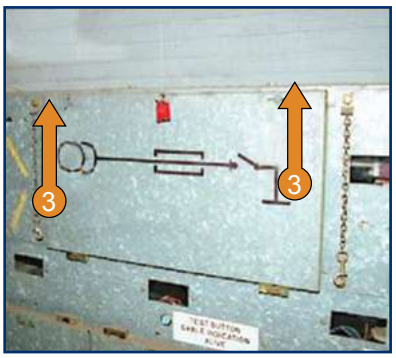
1 Confirm the transformer HV switch is open and the transformer is isolated on the LV side.

2 Remove the HV Fuse access cover padlock.

3 Unscrew the two (2) wing nuts and lower the HV fuses access cover.

4 Discharge and attach earths as required.

Note: *HV fuses may be hot.*



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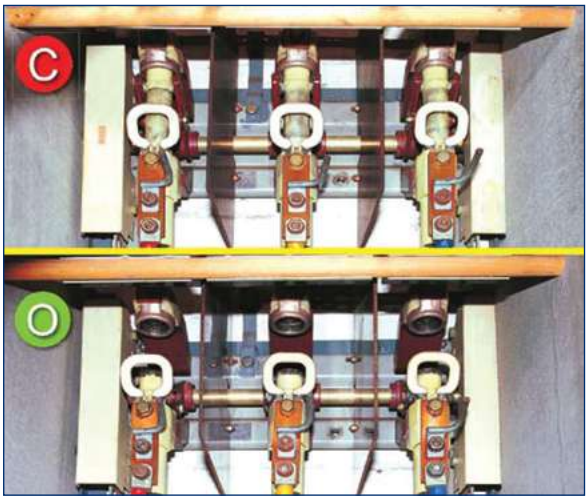
SIEMENS 3C TYPE 2

Prior to any operation

- Confirm the HV switch is fit for service prior to and after any operation.
- Confirm the switch location and labelling prior to operating.

Functions: Opening, Closing
Rating: 400 amps
Insulant: Air
Voltage: 11kV, 6.6kV



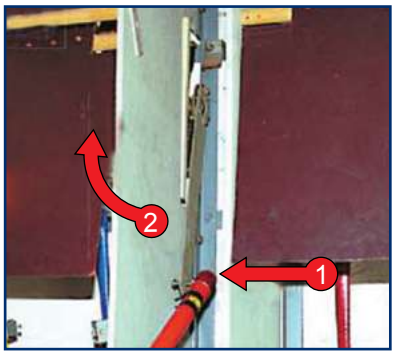
Closing the HV Cable Switch

1 Place the HV operating stick pin into the HV switch operating lever.

2 Raise the operating lever firmly to the stop position to close the HV switch.

3 Remove the HV operating stick.

4 Visually confirm all three phases of the HV switch have dosed correctly.



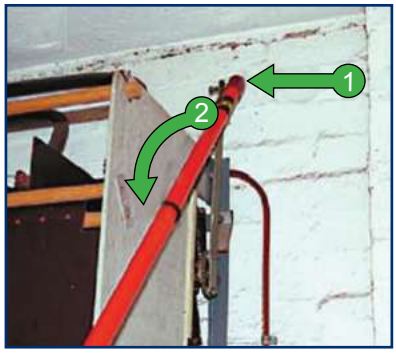
Opening the HV Cable Switch

1 Place the HV operating stick pin into the HV switch operating lever.

2 Lower the operating lever firmly to the stop position to open the HV switch.

3 Remove the HV operating stick.

4 Visually confirm all three phases of the HV switch have opened correctly.



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SIEMENS 3C TYPE 3

Prior to any operation

- Confirm the HV switch is fit for service prior to and after any operation.
- Note There is no earth switch available for access to the transformer HV fuses.
- The earthing mechanism on the switchgear cabinet door is NON OPERATIONAL.
- After any operation visually confirm the HV switch has operated correctly.
- Local electrical operation is always the preferred method.
- Confirm the switch location and labelling prior to operating.
- An access authority is required for access to HV fuses.

Functions: Opening, Closing, HV Fuses
Rating: 400 amps
Insulant: Air
Voltage: 11kV,

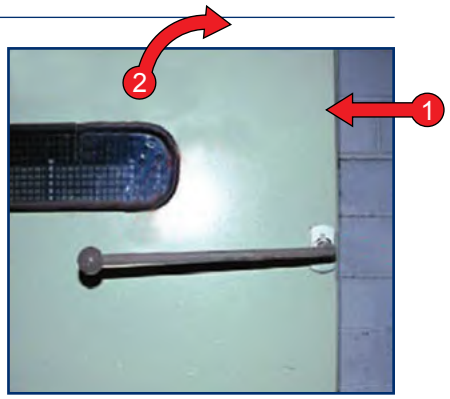
Closing the HV Cable Switch

1 Insert the operating handle into the operating mechanism as shown.

2 Rotate the operating handle **CW** to the stop position to close the HV switch.

3 Remove the operating handle.

4 Visually confirm the HV switch status via the viewing window.



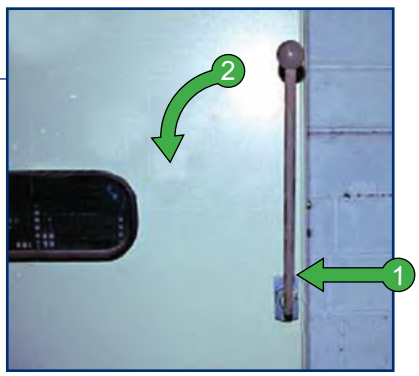
Opening the HV Cable Switch

1 Insert the operating handle into the operating mechanism as shown.

2 Rotate the operating handle **ACW** to the stop position to open the HV switch.

3 Remove the operating handle.

4 Visually confirm the HV switch status via the viewing window.



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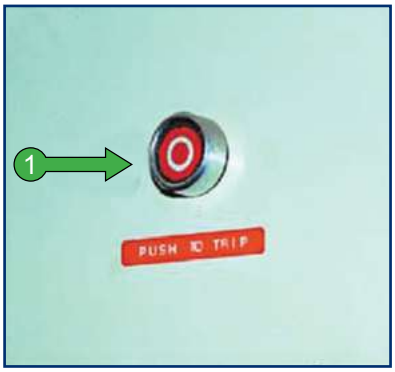
SIEMENS 3C TYPE 3 (CONTINUED)

Opening the HV Cable Switch – Local Electrical

1 Press the **red** 'O' button to open the HV switch.

2 Visually confirm the HV switch status via the viewing window.



Access to the HV Fuses

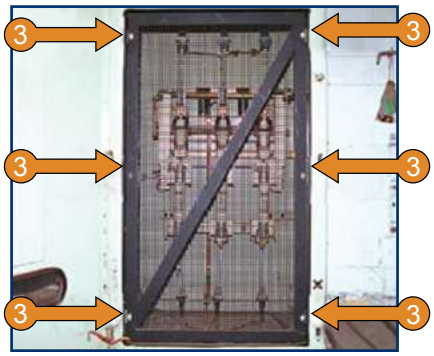
1 Confirm the HV switch is open.

2 Insert the HV switchgear cabinet access keys and rotate to open access door as shown.

3 Unscrew the six (6) retaining nuts and remove the HV fuse access wire mesh guard panel.

4 Perform a 'Safe To Earth' test and attach earths as required.

Note: *HV fuses may be hot.*



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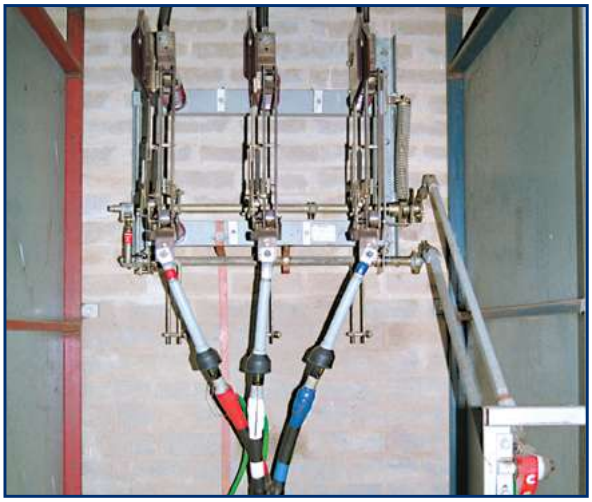
SIEMENS H251

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	630 amps
Insulant:	Air
Voltage:	22kV

Prior to any operation:

- There are two types of operating mechanisms associated with this switch. Instructions on both are shown below.
- This switchgear must be operated with cubicle doors closed.
- Check HV switch is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.
- Access Authority is required for access to HV fuses.



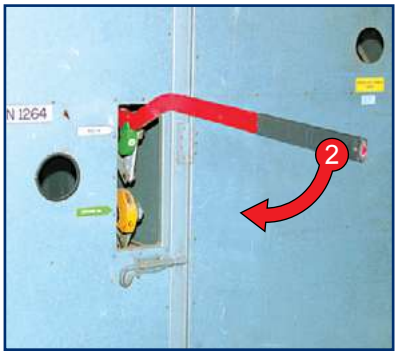
Closing HV Cable Switch Type A:

1 Insert operating handle in open / close operating mechanism.

2 Lower operating handle to **CLOSE** HV switch.

3

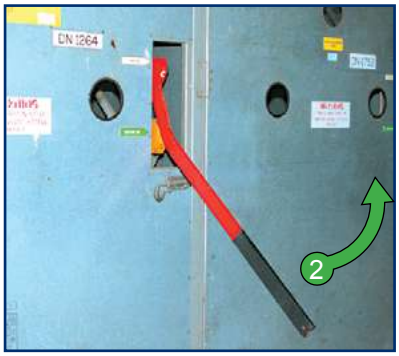
4



Opening HV Cable Switch Type A:

1 Insert operating handle in open / close operating mechanism.

2 Raise operating handle to **OPEN** HV switch.



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SIEMENS H251 (CONTINUED)

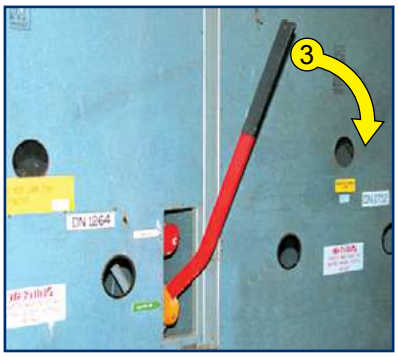
Earthing of HV Cable Type A:

1 Carry out Safe to Earth test.

2 Insert operating handle into HV earth switch operating mechanism.

3 Lower operating handle to **CLOSE** HV earth switch.

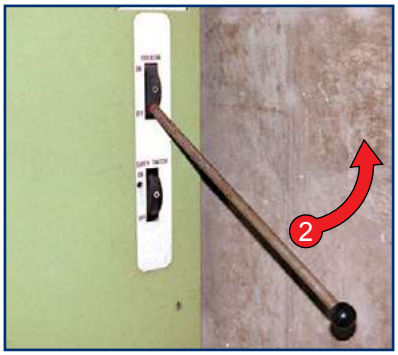
Note: *Ensure remote end of incoming cable to be earthed is isolated.*



Closing HV Cable Switch Type B:

1 Insert operating handle in open/close operating mechanism.

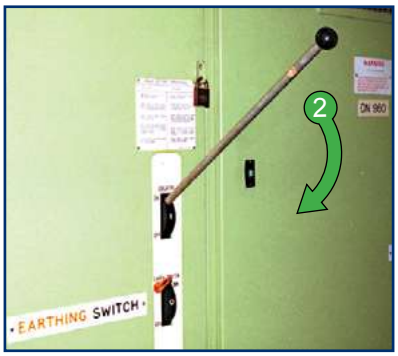
2 Raise operating handle to **CLOSE** HV switch



Opening HV Cable Switch Type B:

1 Insert operating handle in open / close operating mechanism.

2 Lower operating handle to **OPEN** HV switch.



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SIEMENS H251 (CONTINUED)

3 Earthing of HV Cable Type B:

1 Carry out Safe to Earth test.

2 Insert operating handle into HV earth switch operating mechanism.

3 Raise operating handle to CLOSE HV earth switch.

Note: *Ensure remote end of incoming cable to be earthed is isolated.*

Close/Open/Earth Transformer HV Switch

1 Operation as per either HV switch operating mechanism type A: or type B above or on previous pages.

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SIEMENS H515 CIRCUIT BREAKER

Prior to any operation:

- Confirm the circuit breaker is fit for service prior to and after any operation.
- Confirm oil levels are correct on all three phases of the circuit breaker.
- Note: If the circuit breaker plug box is removed then the spring charge motor LV fuse must be removed prior to the re-insertion of the plug box. The spring charge motor LV fuse can be replaced only after the plug box has been re-inserted.
- Confirm the circuit breaker location and labelling prior to any operation.

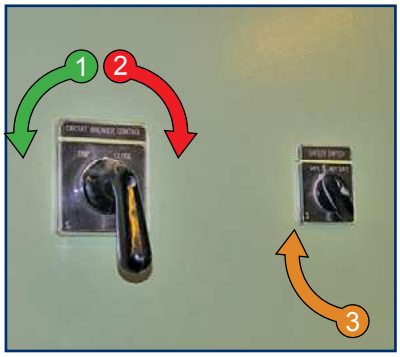
Functions:	Opening, Closing, Racking, HV Fuses
Rating:	630 amps
Insulant:	Oil
Voltage:	22kV

Opening / Closing the CB - Local Electrical

1 Rotate the CIRCUIT BREAKER CONTROL switch **ACW** to the 'TRIP' position to **OPEN** the CB.

2 Rotate the CIRCUIT BREAKER CONTROL switch **CW** to the 'CLOSE' position to **CLOSE** the CB.

3 If the CB cubicle door is to be opened then the SAFETY SWITCH must be rotated to the 'SAFE' position.



Opening / Closing the CB - Local Manual

1 Confirm the SAFETY SWITCH is in the 'SAFE' position.

2 Unlock and open the CB cubicle access door.

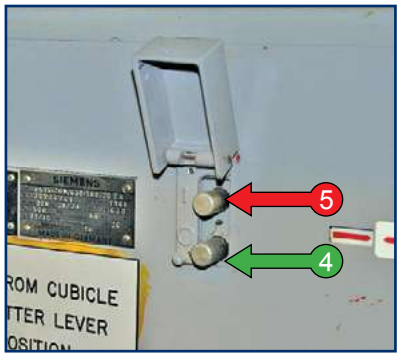
3 Raise the manual control buttons access cover as shown.

4 Press the 'O' button to **OPEN** the CB.

5 Press the 'I' button to **CLOSE** the CB.

6 Lower the manual control buttons access flap.

Note: *Electrical operation is always the preferred method of operation.*



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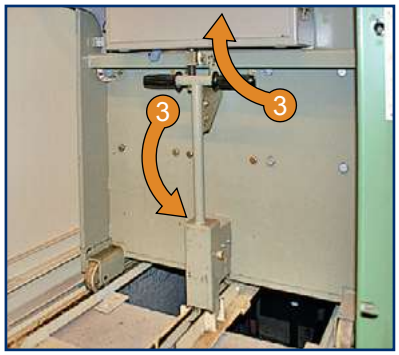
SIEMENS H515 CIRCUIT BREAKER (CONTINUED)

Racking Out the Circuit Breaker

1 Confirm the CB is open and the SAFETY SWITCH is in the SAFETY position.

2 Unlock and open the CB cubicle access door.

3 Grasp the racking handle, lift then pull forward until the CB reaches the first stop position then lower the racking handle. The CB is now in the 'isolated' position.

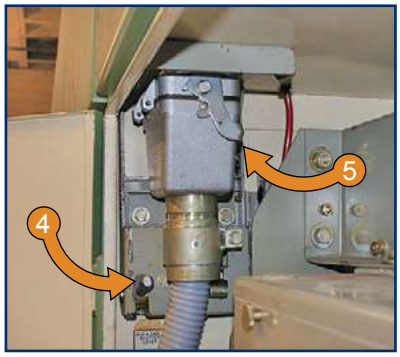


4 Lower the bus and cable shutters Open / Close interlock lever.

5 Raise the retaining clip on the CB plug box.

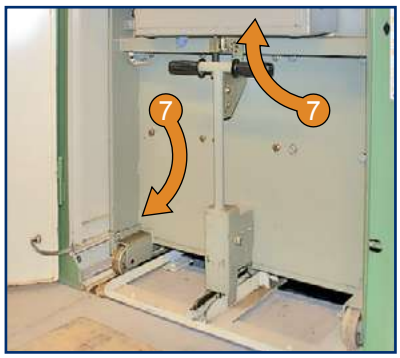
6 Remove and stow the CB plug box.

Note: *The CB plug box cannot be withdrawn until the shutter mechanism control lever is fully lowered (bus and cable shutters closed).*



7 Grasp the racking handle, lift then pull forward and withdraw the CB from the CB cubicle.

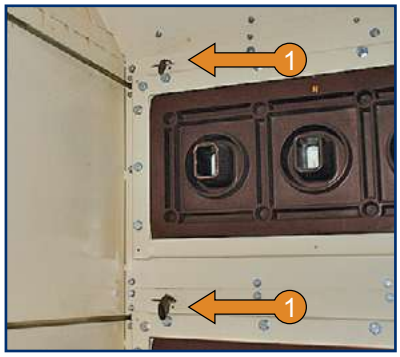
Note: *Ensure the SAFETY SWITCH is in the SAFETY position prior to racking out the CB.*
Ensure the CB plug box has been removed and stowed safely prior to racking the CB out of the cubicle.



Locking the Shutters

1 Using padlocks, lock the required shutters as shown.

Note: *Confirm required shutters prior to locking.*



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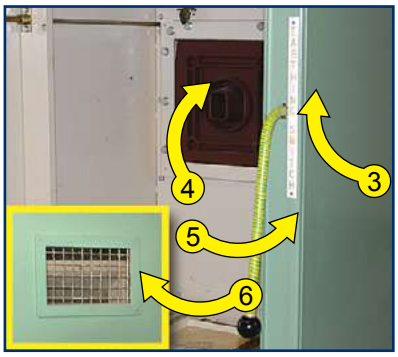
SIEMENS H515 CIRCUIT BREAKER (CONTINUED)

Closing / Opening the HV Cable Earth Switch



1 Ensure the CB has been removed from the CB cubicle.

2 If applicable perform a 'Safe to Earth' test.

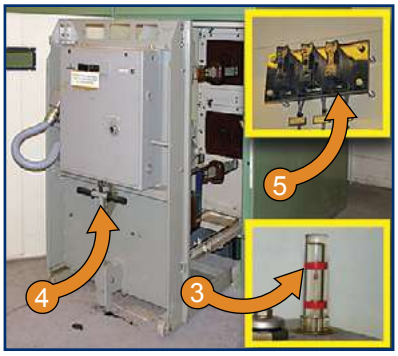
3 Insert the earth switch operating handle into the operating mechanism as shown.

4 Rotate the earth switch operating handle **CW** to the stop position to **CLOSE** the earth switch.

5 Rotate the earth switch operating handle **ACW** to the stop position to **OPEN** the earth switch.

6 Confirm the earth switch status via the viewing window at the rear of the CB cubicle.

Racking In the Circuit Breaker



1 Confirm the CB is open and ready for service.

2 Confirm the shutters are unlocked.

3 Confirm the CB oil levels are correct on all three phases.

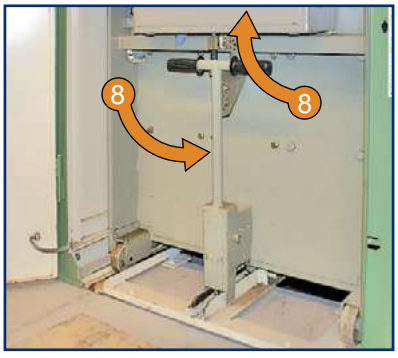
4 Raise the racking handle then push the CB into the CB cubicle to the first stop position and lower the racking handle.

5 Remove the spring charge motor LV fuse - located in the control cabinet above the CB cubicle.

6 Re-insert the CB plug box and close the retaining clip.

7 Raise the bus and cable shutters Open / Close interlock lever.

Note: *Ensure the bus and cable shutters Open / Close interlock lever is full raised prior to racking in the CB to the service position.*



8 Raise the racking handle then push the CB into the CB cubicle to the stop position - service position - and lower the racking handle.

9 Replace the spring charge motor LV fuse - located in the control cabinet above the CB cubicle. The CB spring charge motor will activate and charge the operating spring.

10 If required, close and lock the CB cubicle access door.

Note: *Ensure the racking handle is fully lowered once the CB has been pushed into the service position.*

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SIEMENS H515 CIRCUIT BREAKER (CONTINUED)

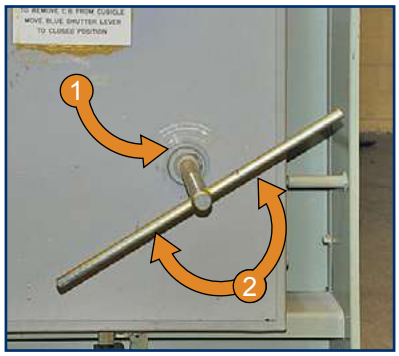
Charging the Operating Spring - Manually

1 Insert the spring charge handle into the spring charge mechanism as shown.

2 Rock the spring charge handle to and fro until the operating spring is fully charged – mechanism frees.

3 Remove the spring charge handle.

4 Confirm the spring charge semaphore agrees with the operating spring status.



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SIEMENS TYPE 8DJ10

Prior to any operation:

- If equipped with a gas indication gauge check for correct pressure prior to switching.
- Confirm switch location and labelling prior to operation.
- Access Authority required for access to HV fuses.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV

Closing HV Cable/Transformer Switch

1 Insert operating handle into HV switch operating mechanism (white background).

2 Push operating handle downwards from ‘O’ to ‘I’ to **CLOSE** HV switch.

3 Confirm semaphore agrees with switch status.

Opening HV Cable / Transformer Switch

1 Insert operating handle into HV switch operating mechanism (white background).

2 Pull operating handle upwards from ‘I’ to ‘O’ to **OPEN** HV switch.

3 Confirm semaphore agrees with switch status.

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SIEMENS TYPE 8DJ10 (CONTINUED)

Earthing of HV Cable / Transformer

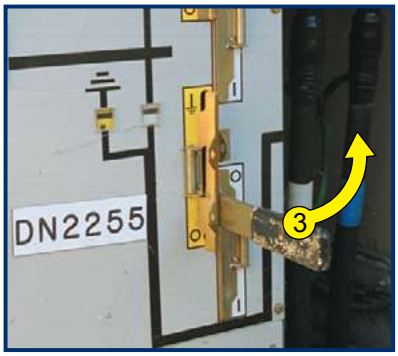
1 Carry out Safe to Earth test.

2 Insert operating handle into HV earth switch operating mechanism (yellow background).

3 Pull operating handle upwards from 'O' to 'I' to **EARTH** HV cable.

4 Confirm semaphore agrees with switch status.

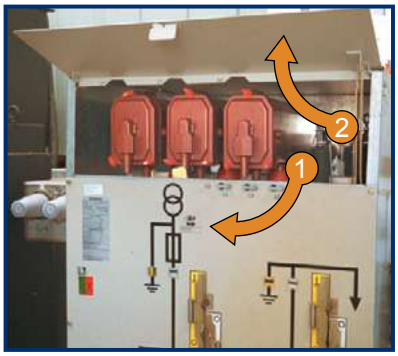
Note: *Ensure remote end of incoming cable to be earthed is isolated.*



HV Fuse Access

1 With the transformer HV earth switch closed slide the HV fuse access cover interlock pin to the left.

2 Raise the HV fuse access cover.



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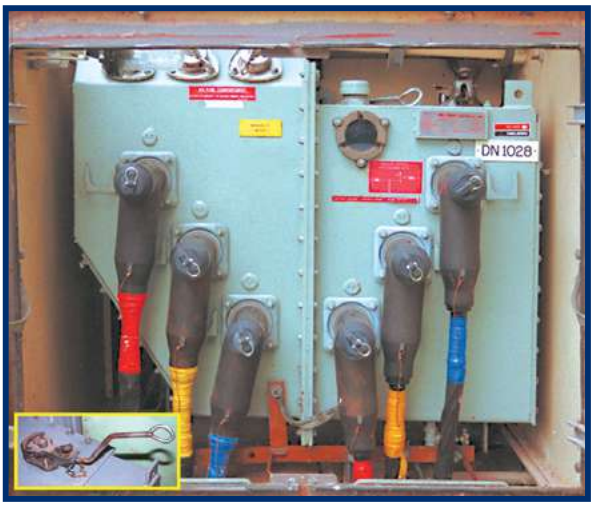
SOLAR BASIC

Prior to any operation:

- Prior to switching check HV switch oil level gauge.
- Note removal / replacement of transformer HV fuses: NX type HV fuses can only be removed or replaced with sub station de-energised. For instruction on removal / replacement refer to 'NX HV Fuses' section of this manual.
- For cable elbow operation refer to '200/400 or 600A Cable Elbows' section of this manual.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing, Earthing, HV Fuses
Rating:	630 amps
Insulant:	Oil
Voltage:	22kV



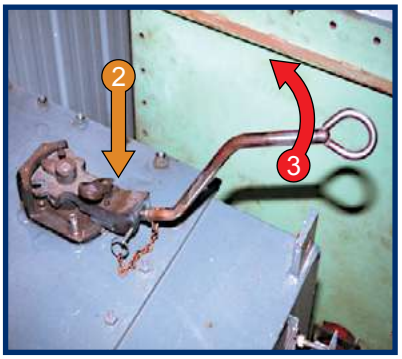
Closing HV Cable Switch

1 Insert operating handle into HV switch operating mechanism.

2 Rotate HV switch interlock pointer **CW** to stop position, (pointing to the right).

3 Move operating handle **ACW** to the right to CLOSE HV switch.

4 Confirm semaphore status.



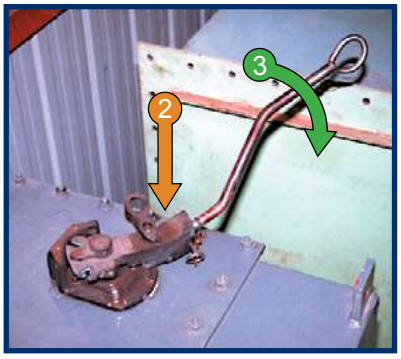
Opening HV Cable Switch

1 Insert operating handle into HV switch operating mechanism.

2 Rotate HV switch interlock pointer **ACW** to stop position, (pointing to the left).

3 Move operating handle **CW** to the left to OPEN HV switch.

4 Confirm semaphore status.



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SOLAR BASIC (CONTINUED)

Earthing of HV Cable

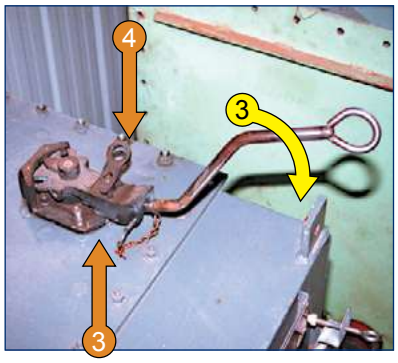
1 Carry out Safe to Earth test.

2 With HV switch in the open position insert operating handle into HV switch operating mechanism.

3 Remove grub screw from left side of mechanism and transfer to right side of mechanism.

4 Rotate HV switch interlock pointer **ACW** to stop position, (pointing to the left).

5 Move operating handle **CW** to the left to CLOSE HV earth switch.



Note: *Ensure remote end of incoming cable to be earthed is isolated.*

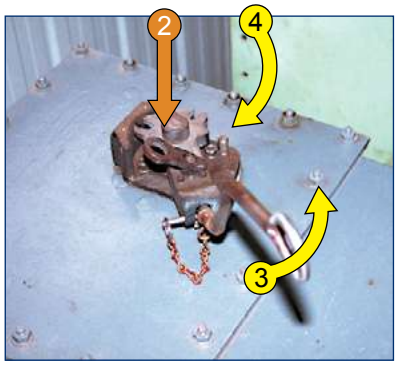
Removal of HV Earth

1 Insert operating handle into HV switch operating mechanism.

2 Rotate HV switch interlock pointer **CW** to stop position, (pointing to the right).

3 Move operating handle **ACW** to the right to remove HV earth.

4 Transfer grub screw from right side of operating mechanism back to left side of operating mechanism.



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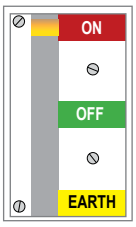
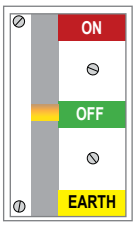
SOUTH WALES IF4X

Prior to any operation

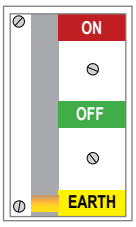
- Confirm the switchgear is fit for service prior to and after any operation.
- This switchgear (left side of the main picture) can be used as a single unit or as a combination with other switchgear such as the **South Wales D4XD CB** as shown on the right side of the main picture.
- Confirm the switch location and labelling prior to operating.



HV Switch Closed

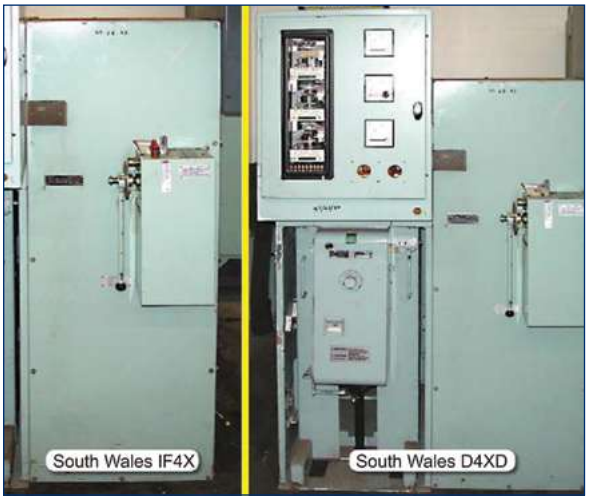


HV Switch Open



Earth Switch Closed

Functions: Opening Closing
Rating: 400 amps
Insulant: Oil
Voltage: 11kV

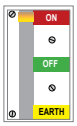


Closing the HV Cable Switch

1 Engage the operating handle on top of the operating mechanism locating pin as shown.

2 Lower the operating handle to the stop position to close the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows 

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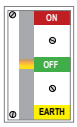
Opening the HV Cable Switch

1 Engage the operating handle behind the operating mechanism locating pin as shown.

2 Raise the operating handle to the stop position to open the HV switch.

3 Remove the operating handle.

4 Confirm the semaphore shows 

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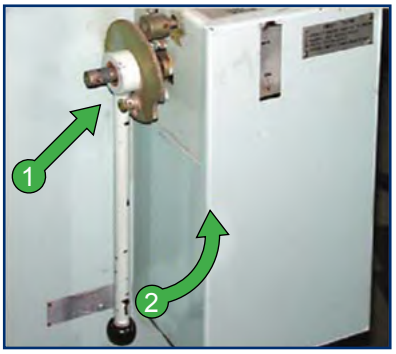

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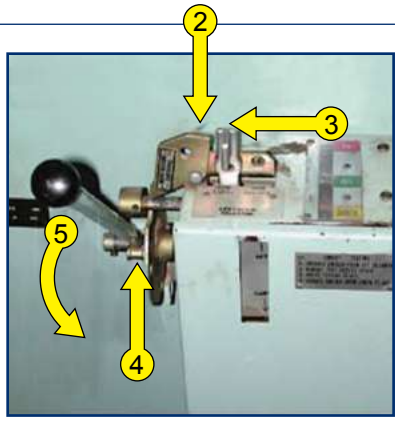
SOUTH WALES IF4X (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm relevant the HV switch is open.

2 Unlock and rotate the HV earth switch interlock **ACW** as shown.

3 Slide the operating selector across to the 'EARTH' position as shown.

4 Engage the operating handle on top of the operating mechanism locating pin as shown.

5 Lower the operating handle to close the HV earth switch.

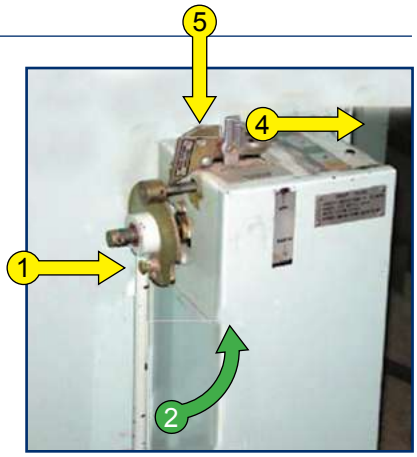
6 Remove the operating handle.

7 Confirm the semaphore shows

.

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

Opening the HV Cable Earth Switch



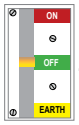
1 Engage the operating handle behind the operating mechanism locating pin as shown.

2 Raise Ute operating handle to Ute stop position to open the HV earth switch.

3 Remove the operating handle.

4 Slide the operating selector across to the 'SERVICE' position.

5 Rotate the HV earth switch Interlock **CW** and padlock if required.

6 Confirm the semaphore shows 

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SOUTH WALES D4XD CB

Prior to any operation

- Confirm the CB is fit for service prior to and after any operation.
- This circuit breaker can be used as a single unit or as a combination with other switchgear such as the **South Wales IF4X HV** switch as shown in the main picture insert.
- Remote operation of these CBs is always the preferred method.
- Confirm the CB location and labelling prior to operating.

CB Closed

CB Open

Functions: Opening, Closing, Isolating
Rating: 400 amps
Insulant: Oil
Voltage: 11kV

Closing the CB

1 Confirm the CB is fully racked in to the ‘SERVICE’ position.

2 Pull back the spring charge handle locking latch.

3 Raise the spring charge handle to the stop position and ‘SPRINGS’ window semaphore indicates ‘CHARGED’.

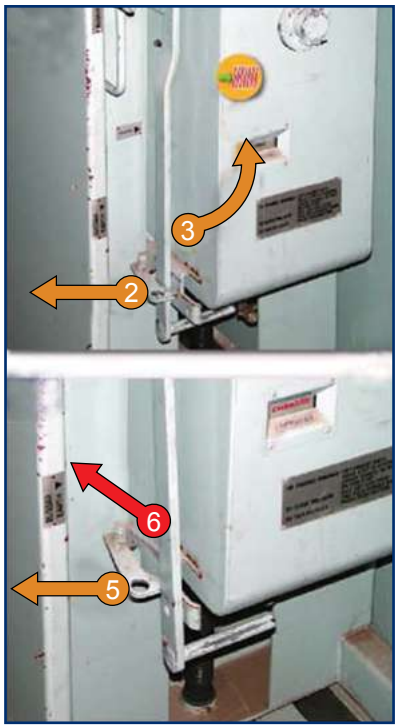
4 Lower the spring charge handle until it reaches the locking latch as shown.

5 Pull back the spring charge handle locking latch.

6 Push In the spring charge handle to the stop position to close the CB.

7 Confirm the semaphores shows

.



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SOUTH WALES D4XD CB (CONTINUED)

Opening the CB

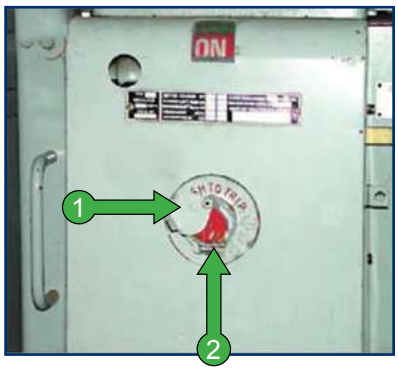
1 Open the 'PUSH TO TRIP' access flap.

2 Push the red 'PUSH TO TRIP' button to open the HV CB.

3 Close the 'PUSH TO TRIP' access flap.

4 Confirm the semaphore shows

.



Racking Out the CB

1 Confirm the CB is open.

2 Raise the 'ISOLATING MECHANISM' interlock latch.

3 Slide the 'ISOLATING MECHANISM' interlock across to the 'FREE' position.

4 Place the CB racking handle onto the racking shaft as shown.

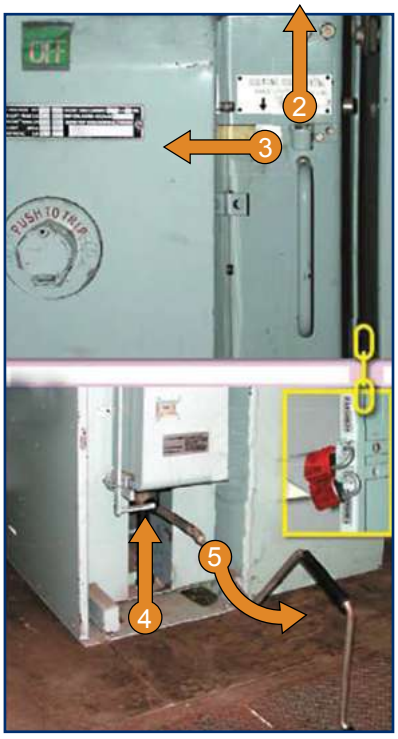
5 Rotate the racking handle **ACW** to stop position and CB pointer aligns with 'ISOLATED' indicator.

6 Remove the CB racking handle.

7 Carefully withdraw the CB from the CB cubicle.

8 Lock the bus / cable shutter (s) as required.

Note: *Ensure correct identification of shutters prior to locking.*



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SOUTH WALES D4XD CB (CONTINUED)

Racking in the CB

1 Confirm the CB is open.

2 Confirm the 'LOCATION SELECTOR' Is In the 'SERVICE' position.

3 Push the CB into CB cubicle until the pointer aligns with the 'SERVICE POSITION' indicator.

Note: *Ensure the shutter locks have been removed and the CB is open prior to racking in.*

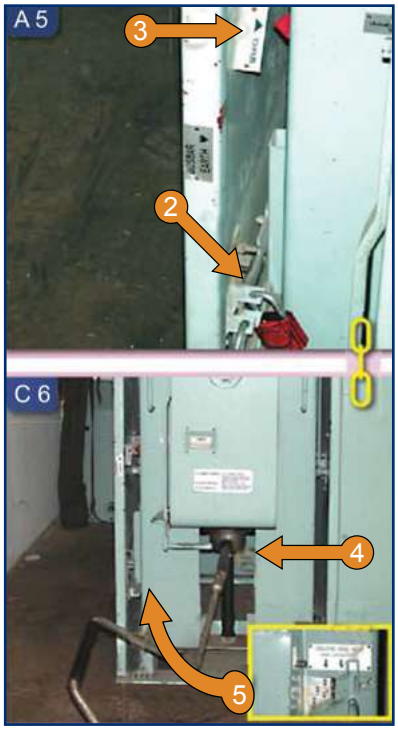
4 Place the CB racking handle onto the racking shaft as shown.

5 Rotate the racking handle **CW** to stop position and CB pointer aligns with 'PLUGGED IN' indicator.

6 Remove the CB racking handle.

7 Slide the 'ISOLATING MECHANISM' interlock across to the 'LOCKED' position.

8 LOWER the 'ISOLATING MECHANISM' interlock latch.



Racking the CB into the Circuit Earth Position

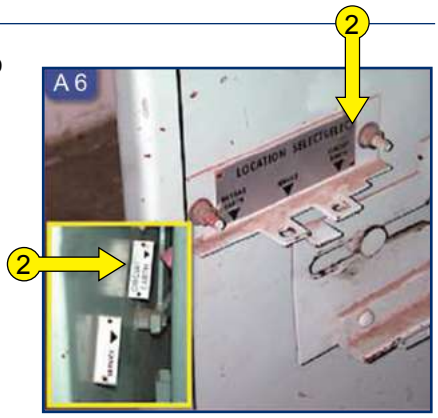
1 With the CB racked out slide the 'LOCATION SELECTOR' to the 'CIRCUIT EARTH' position.

2 Push the CB into CB cubicle until the pointer aligns with the 'CIRCUIT EARTH' indicator.

3 Continue to rack in the CB as per the **Racking in the CB** instruction above.

4 Close the CB as per the **Closing the CB** instruction to earth the circuit.

Note: *Ensure the correct identification of shutters prior to locking. Ensure the remote end of incoming HV cable to be earthed is isolated.*



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STANGER SCD-2

Functions:	Opening, Closing, Trans Switch/ CB, HV Fuses
Rating:	400 Amps
Insulant:	Air
Voltage:	11kV

Prior to any operation:

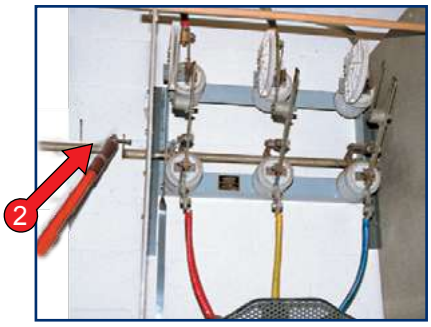
- Confirm the HV switch arc chutes are latched correctly prior to opening and after closing.
- Note: There are two types of operating mechanisms associated with this switch.
- Instructions on both are shown below.
- The HV operating stick lever can be located on either side of the HV switch.
- These HV switches can be found in combination with Powder Filled HV Fuses.
- Access Authority required for access to HV fuses.

Closing the HV Cable Switch - Type A

1 Place the HV operating stick pin in the HV switch operating lever as shown.

2 Push firmly to the stop position to **CLOSE** the HV switch.

3 Visually confirm all three phases of the HV switch have closed and latched correctly.

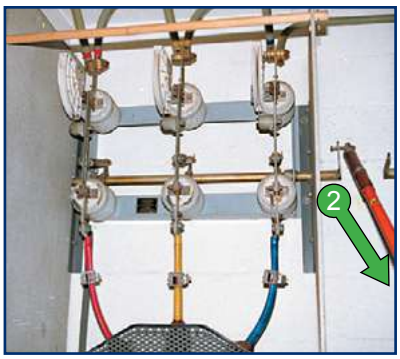


Opening the HV Cable Switch - Type A

1 Place the HV operating stick pin in the HV switch operating lever as shown.

2 Pull firmly to the stop position to **OPEN** the HV switch.

3 Visually confirm the HV switch has opened correctly.



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STANGER SCD-2 (CONTINUED)

Closing / Opening the Trans Switch - Type A

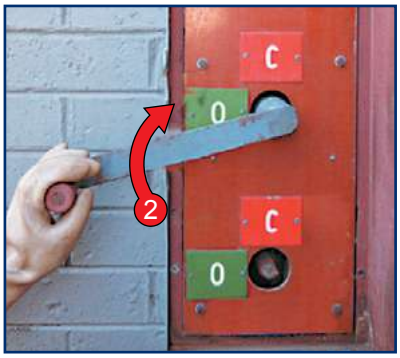
1 Operation as for the 'Closing and Opening of HV Cable Switches - Type A' as shown above.

Closing the HV Cable / Trans Switch - Type B

1 Place the operating handle on the 'Open / Close' operating mechanism as shown.

2 Rotate the operating handle **CW** firmly to the stop position to CLOSE the HV switch.

3 Visually confirm all three phases of the HV switch have closed and latched correctly.

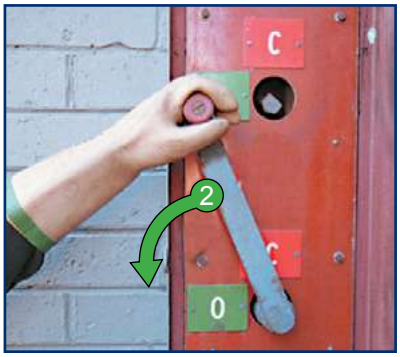


Opening the HV Cable / Trans Switch - Type B

1 Place the operating handle on the 'Open / Close' operating mechanism as shown.

2 Rotate the operating handle **ACW** firmly to the stop position to OPEN the HV switch.

3 Visually confirm the HV switch has opened correctly.



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STANGER SINGLE PHASE OPERATED A/C

Prior to any operation:

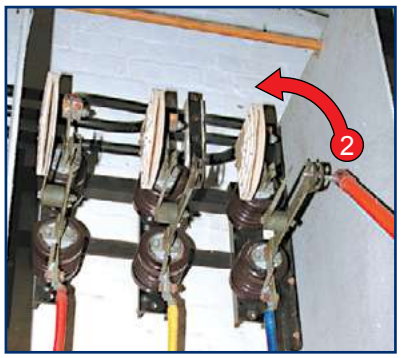
- Ensure HV switch arc chutes are latched correctly prior to opening and after closing.
- Confirm switch location and labelling prior to operation.
- Acces Authority required to access HV fuses.

Functions:	Opening, Closing, Trans Switch, HV Fuses
Rating:	400 amps
Insulant:	Air
Voltage:	11kV

Closing HV Cable Switch

1 Place HV operating stick pin into A/C latching / operating eye.

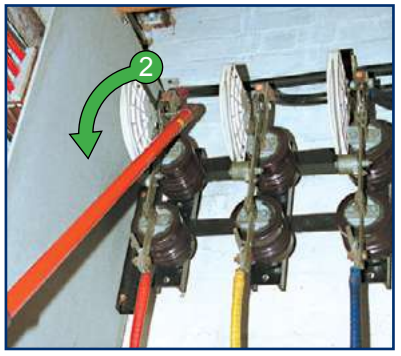
2 Push single phase A/C firmly to **CLOSE**.



Opening HV Cable Switch

1 Place HV operating stick pin into A/C latching / operating eye.

2 Pull single phase A/C firmly to **OPEN**.



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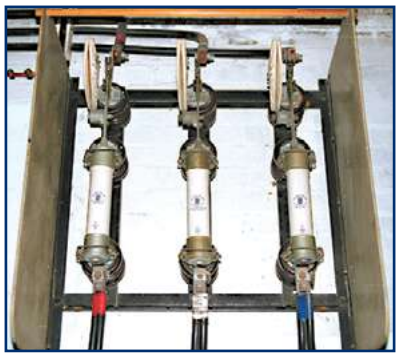
STANGER SINGLE PHASE OPERATED A/C (CONTINUED)

Closing / Opening Transformer Switch

1 Operation as previous..



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STATTER/MI EOD

Prior to any operation

- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the HV switch oil level is correct prior to any operating.
- Confirm the switch location and labelling prior to operating.

Warning: *On some radial feeders in the MCC area the HV earth switch on the Statter switch units closes on the incoming HV cable with the transformer HV cable coming off the end box.*

HV Switch Closed

HV Switch Open

Earth Switch Closed

Functions:	Opening,Closing, Earthing
Rating:	400 amps
Insulant:	Oil
Voltage:	11kV, 6.6kV

Closing the HV Cable Switch

1 Lower the operating handle to the stop position to close the HV switch.

2 Confirm the semaphore shows

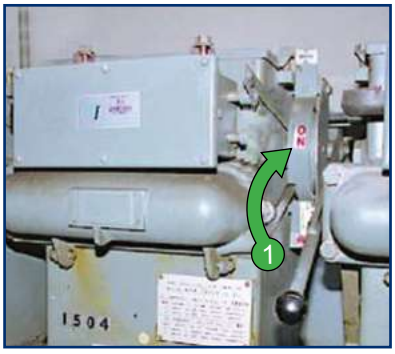
.

Opening the HV Cable Switch

1 Raise the operating handle to the stop position to open the HV switch.

2 Confirm the semaphore shows

.



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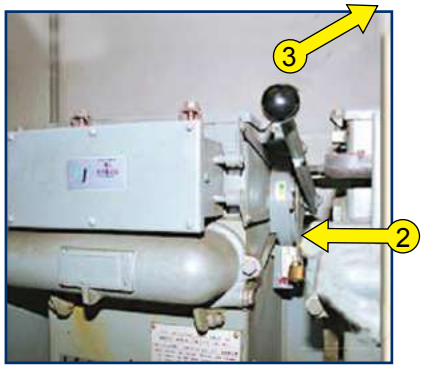
STATTER/MI EOD (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm relevant the HV switch is open.

2 Unlock the padlock and raise the earth switch interlock lever to the stop position.

3 Raise the operating handle to the stop position to close the HV earth switch.

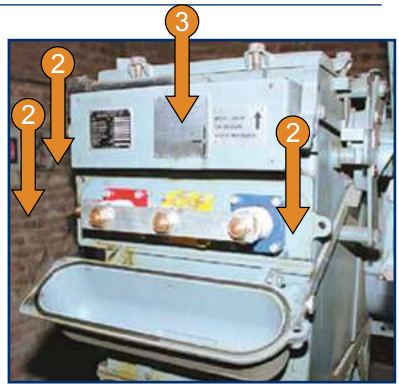
4 Confirm the semaphore shows

.

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing.*

Note: *To open HV cable earth switch, rotate handle in anti-clockwise direction.*

Access to the Test Probes



1 Confirm the relevant earth switch is closed.

2 Unscrew the three (3) reataining bolts and lower the test terminals access cover as shown.

3 Unscrew and remove the earthing bar from the test terminals.

4 Attach the required testing equipment and perform tests.

5 Re-attach the earthing bar to the test terminals.

6 Close and secure the test terminals access cover.

Note: *On the completion of tests ensure the correct re-attachment of the earthing bar to the test terminals*

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STATTER OD

Prior to any operation

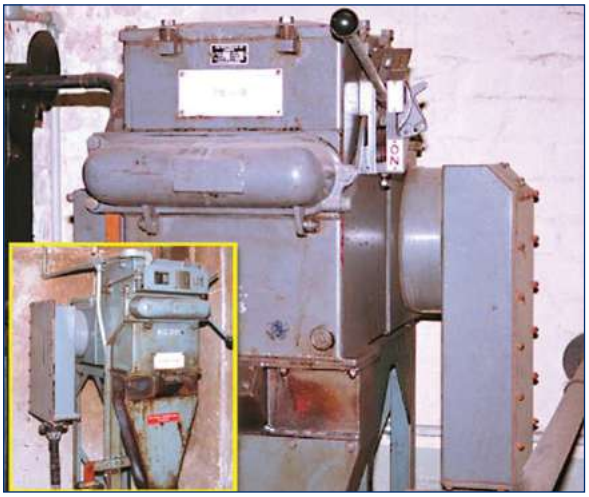
- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the HV switch oil level is correct prior to any operation.
- Confirm the switch location and labelling prior to operating.
- Warning: On some radial feeders in the MCC area the HV earth switch on the Statter switch units closes on the incoming HV cable with the transformer HV cable coming off the end box.
- Caution: This switchgear is NOT spring assisted. Operation must be a rapid, firm and continuous motion.

HV Switch Closed

HV Switch Open

Earth Switch Closed

Functions: Opening, Closing, Earthing
Rating: 400 amps
Insulant: Oil
Voltage: 11kV, 6.6kV



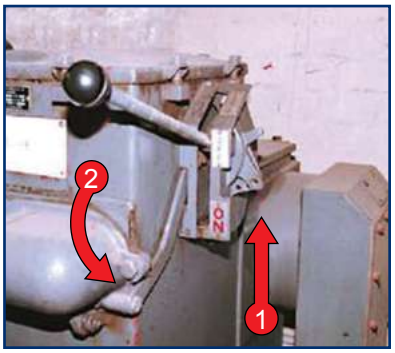
Closing the HV Cable Switch

1 Raise the operating handle Interlock lever to the stop position.

2 Lower the operating handle in a rapid, firm and continuous motion to the stop position to close the HV switch.

3 Confirm the semaphore shows

.



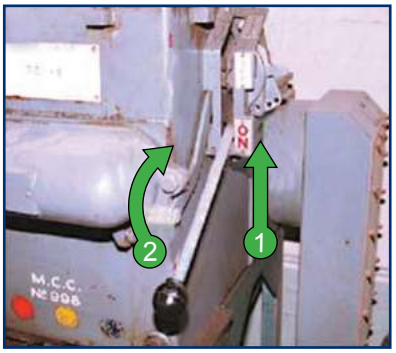
Opening the HV Cable Switch

1 Raise the operating handle interlock lever to the slop position.

2 Raise the operating handle in a rapid, firm and continuous motion to the stop position to open the HV switch.

3 Confirm the semaphore shows

.



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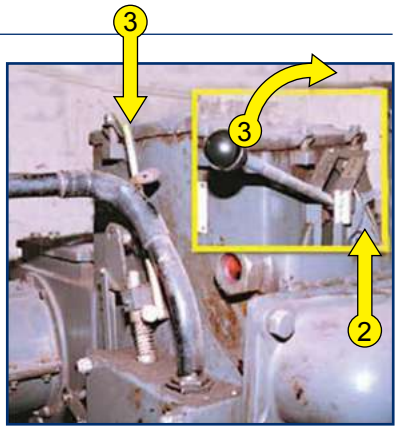
STATTER OD (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm relevant the HV switch is open.

2 Raise the operating handle interlock lever to the stop position.

3 Remove the padlock and push down the spring loaded earth switch interlock whilst raising operating handle in a rapid, firm and continuous motion to the 'EARTH' position.

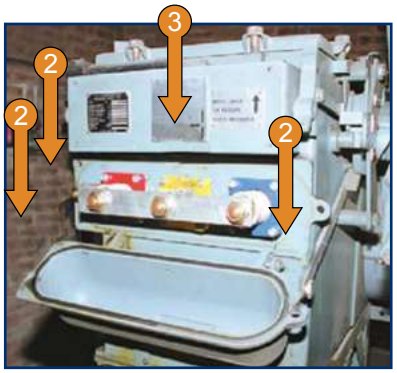
4 Confirm the semaphore shows

.

Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing. If Earthing the transformer, perform a 'Safe to Earth' test at the transformer connections if required.*

Note: *To open HV cable earth switch, lower the operating interlock lever to the open position.*

Access to the Test Probes



1 Confirm the relevant earth switch is closed.

2 Unscrew the three (3) reataining bolts and lower the test terminals access cover as shown.

3 Unscrew and remove the earthing bar from the test terminals.

4 Attach the required testing equipment and perform tests.

5 Re-attach the earthing bar to the test terminals.

6 Close and secure the test terminals access cover.

Note: *On the completion of tests ensure the correct re-attachment of the earthing bar to the test terminals.*

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STATTER ODSA

Prior to any operation

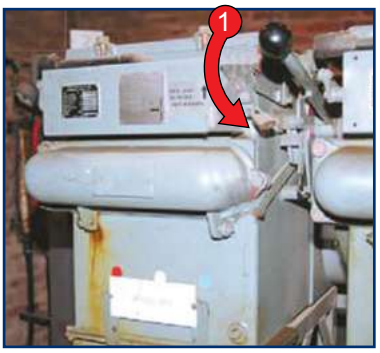
- Confirm the switchgear is fit for service prior to and after any operation.
- Confirm the HV switch oil level is correct prior to any operating.
- Confirm the switch location and labelling prior to operating.
- Warning: On some radial feeders in the MCC area the HV earth switch on the Statter switch units closes on the incoming HV cable with the transformer HV cable coming off the end box. As per photo below.

Functions: Opening, Closing, Earthing
Rating: 400 amps
Insulant: Oil
Voltage: 11kV, 6.6kV

Closing the HV Cable Switch

1 Lower the operating handle to the stop position to close the HV switch.

2 Confirm the semaphore agrees with the HV switch status.

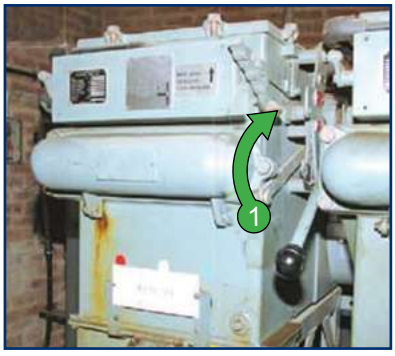


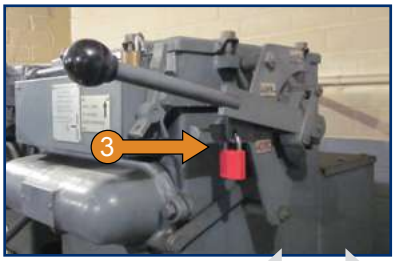
Open and Lock the HV Cable Switch in Open Position

1 Raise the operating handle to the stop position to open the HV switch.

2 Confirm the semaphore agrees with the HV switch status.

3 Raise switch interlock lever to centre position and insert padlock through interlock lever and switchgear open locking position and lock as shown.





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STATTER ODSA (CONTINUED)

Closing the HV Cable Earth Switch

1 Confirm relevant the HV switch is open.

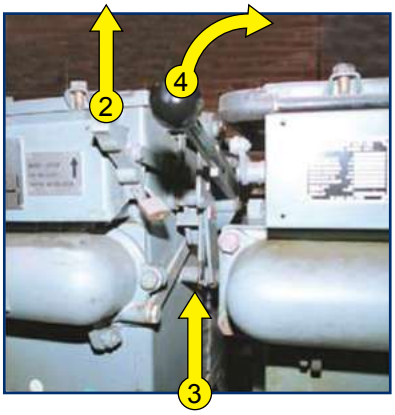
2 Unlock the padlock and raise the earth switch interlock lever.

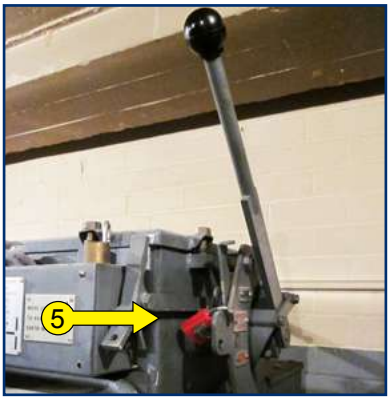
3 Raise the HV switch interlock lever to the stop position.

4 Raise the operating handle to the stop position to close the HV earth switch.

5 Insert the padlock and lock in position as shown.

6 Confirm the semaphore agrees with the HV switch status.





Note: *There is no facility available for a 'Safe to Earth' test. Ensure the remote end of HV Cable is isolated prior to earthing. If Earthing the transformer, perform a 'Safe to Earth' test at the transformer connections if required.*

Note: *To open HV cable earth switch, lower the interlock lever to the open position.*

Access to the Test Probes

1 Confirm the relevant earth switch is closed.

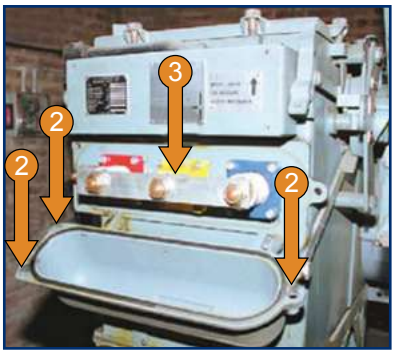
2 Unscrew the three (3) reataining bolts and lower the test terminals access cover as shown.

3 Unscrew and remove the earthing bar from the test terminals.

4 Attach the required testing equipment and perform tests.

5 Re-attach the earthing bar to the test terminals.

6 Close and secure the test terminals access cover.



Note: *On the completion of tests ensure the correct re-attachment of the earthing bar to the test terminals.*

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TSN

Prior to any operation

- Confirm the switchgear is fit for service prior to and after any operation.
- The substation doors must be closed when operating this HV switch.
- Confirm the HV switch location and labelling prior to operating.

Functions: Opening, Closing, Earthing
Rating: 630 amps
Insulant: Air
Voltage: 11kV

Closing the HV Switch

1 Unlock and open the operating mechanism access door.

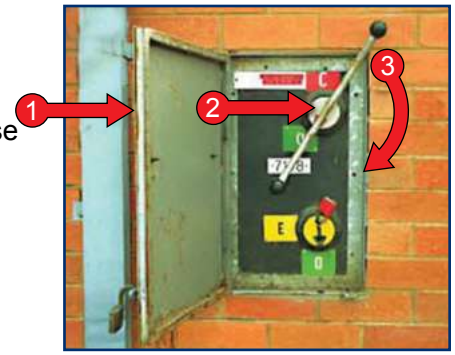
2 Insert the operating handle into the operating mechanism.

3 Rotate the operating handle **CW** to the stop position to close the HV switch.

4 Remove the operating handle.

5 Close and padlock the operating mechanism access door.

6 Visually confirm the HV switch has closed correctly.



Opening the HV Switch

1 Unlock and open the operating mechanism access door.

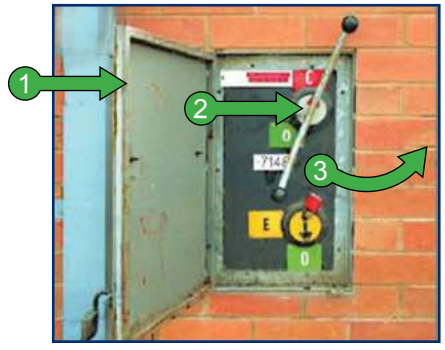
2 Insert the operating handle into the operating mechanism.

3 Rotate the operating handle **ACW** to the stop position to close the HV switch.

4 Remove the operating handle.

5 Close and padlock the operating mechanism access door.

6 Visually confirm the HV switch has opened correctly.



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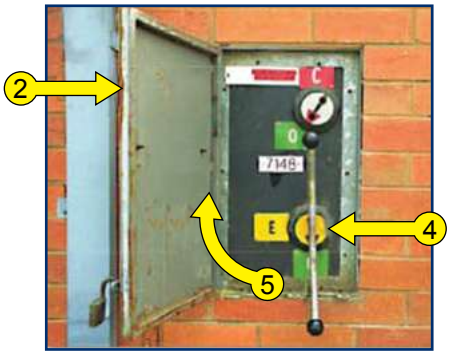
TSN (CONTINUED)

Closing the HV Cable Earth Switch



1 Confirm the HV switch is open.

2 Unlock and open the operating mechanism access door.

3 Perform a 'Safe To Earth' test.

4 Insert the operating handle into the earth switch operating mechanism.

5 Rotate the operating handle **CW** to the stop position to close the HV earth switch.

6 Remove the operating handle.

7 Close and padlock the operating mechanism access door.

8 Visually confirm the HV earth switch has closed correctly.

Note: *Ensure the remote end of the HV Cable is isolated prior to earthing.*

Note: *To open HV cable earth switch, rotate the operating handle in an anti-clockwise direction.*

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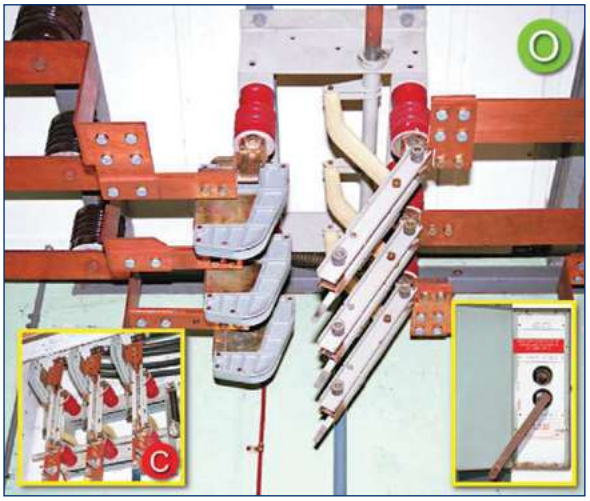
TSN (GMH)

Prior to any operation

- Confirm the switchgear is fit for service prior to and after any operation.
- The substation doors must be closed when operating this HV switch.
- Confirm the HV switch location and labelling prior to operating.

Functions: Opening, Closing
Rating: 400 amps
Insulant: Air
Voltage: 6.6kV



Closing the HV Switch

1 Unlock and open the operating mechanism access door.

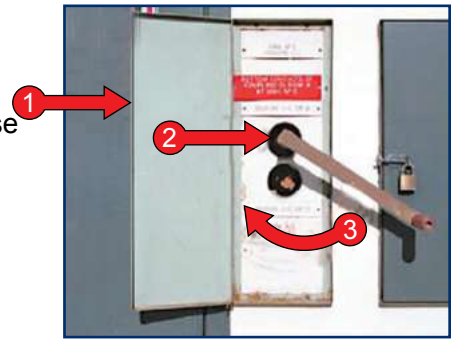
2 Insert the operating handle into the operating mechanism.

3 Rotate the operating handle **CW** to the stop position to close the HV switch.

4 Remove the operating handle.

5 Close and padlock the operating mechanism access door.

6 Visually confirm the HV switch has closed correctly.



Opening the HV Switch

1 Unlock and open the operating mechanism access door.

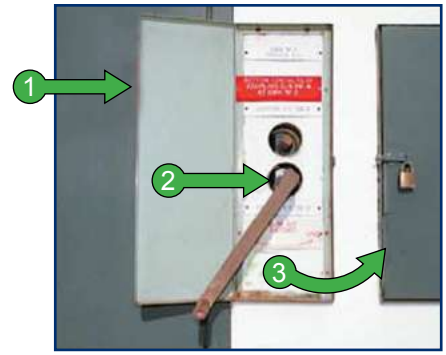
2 Insert the operating handle into the operating mechanism.

3 Rotate the operating handle **ACW** to the stop position to close the HV switch.

4 Remove the operating handle.

5 Close and padlock the operating mechanism access door.

6 Visually confirm the HV switch has opened correctly.



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WILSON – CALOR EMAG OPEN BUS SUBSTATION

Prior to any operation:

- Note that when the transformer HV switch is open, the bottom contacts may still be ALIVE.
- Note the transformer HV fuses are hinged on the transformer side.
- An Access Authority is required for the removal of the transformer HV switch / earth switch / HV fuse access cover.
- Check/confirm oil levels, labelling and semaphores.
- Confirm the HV switch location and labelling.

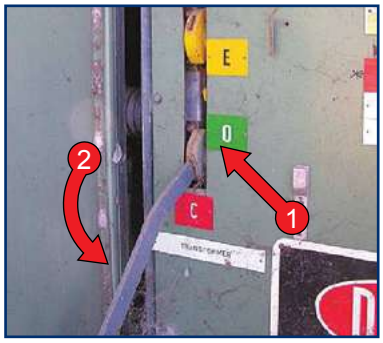
Functions: Opening, Closing, Earthing
Insulant: Air
Voltage: 22kV

Closing the Transformer HV Switch

1 Remove the HV switch operating handle from the retaining clips and insert into the HV switch open I close operating mechanism (grey) as shown.

2 Lower the operating handle firmly to the stop position as shown to **CLOSE** the transformer HV switch.

3 Confirm all three phases have closed correctly via the viewing window..



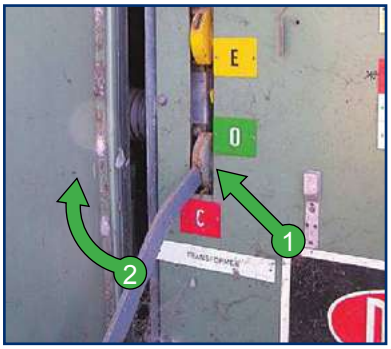
Note: *Confirm the transformer is isolated on the LV side prior to operation.*

Opening the Transformer HV Switch

1 Remove the HV switch operating handle from the retaining clips and insert into the HV switch open I close operating mechanism (grey) as shown.

2 Raise the operating handle firmly to the stop position to **OPEN** the transformer HV switch.

3 Confirm all three phases have opened correctly via the viewing window.



Note: *Confirm the transformer is isolated on the LV side prior to operation.*

WILSON – CALOR EMAG OPEN BUS SUBSTATION

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WILSON – CALOR EMAG OPEN BUS SUBSTATION (CONTINUED)

Closing / Opening the Trans HV Earth Switch

1 Unlock, if required, and open the HV fuse access cover retaining pad bolts.

2 Using the handle as shown carefully lower the HV fuse access cover.

3 Peform a 'Safe To Earth' test and if in order:

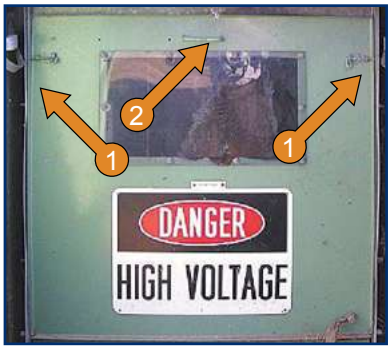
4 Close the HV fuse access cover.

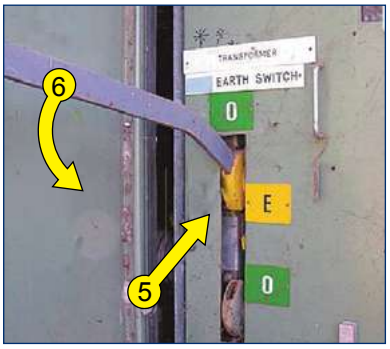
5 Remove the HV switch operating handle from the retaining clips and insert into the HV earth switch open I earth operating mechanism (yellow).

6 Lower the operating handle firmly to the stop position to **CLOSE** the transformer HV earth switch.

7 Confirm all three phases of the HV earth switch have closed correctly via the viewing window.

Note: *Confirm the transformer is isolated on the LV side prior to earthing.*





Earthing the HV Incoming Cable(s)

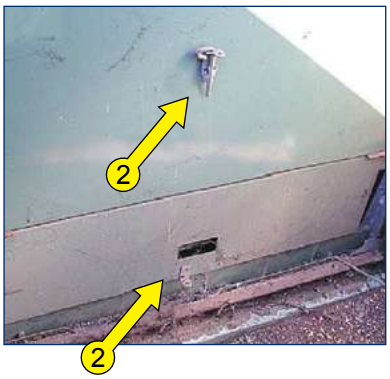
1 Confirm the remote end/s of the incoming HV cable/s is/are isolated.

2 Unlock, if required, and open the HV cable access panel and secure in position using the pad bolt as shown.

3 Perform a 'Safe To Earth' test and if in order:

4 Attach earths to the incoming HV cable(s).

Note: *Confirm the remote end/s of the HV cable/s is/are isolated prior to earthing.*



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WILSON LOOP SUBSTATION

Prior to any operation:

- For the HV cable elbow operation, refer to the 200/400 or 600A Cable Elbows section in this manual.
- Confirm the loop substation location and labelling prior to operation.
- NX type HV fuses can only be removed or replaced with the substation de-energised. HV fuses may be hot.
- Ensure earthing elbows are connected to the substation earth grid prior to earthing.

Functions:	Isolate, Earthing
Rating:	400 Amps
Insulant:	Oil
Voltage:	22KV

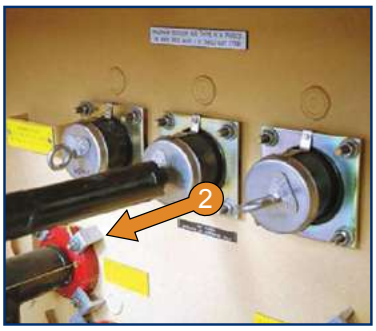
Isolation / Earthing of the HV Cables

For isolation and earthing of the HV Cables refer to the either the 200/400 Amp HV Cable Elbows or the 600 Amp HV Cable Elbows template in this manual.

Removal of the HV Fuses

1 Attach the operating shot-gun stick to the eye bolt on the HV fuse unit access cap.

2 Pull the access cap firmly to withdraw the HV fuse.

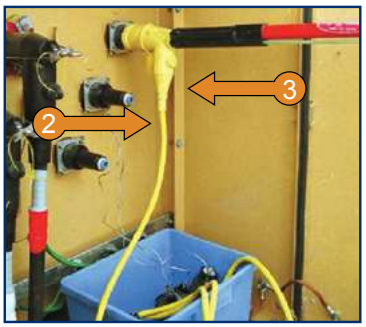


Earthing of the HV Bus

1 Perform a ‘Safe To Earth’ test.

2 Remove the 200 amp dead end receptacles.

3 Attach the earthing elbows using the operating shot-gun stick.



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WILSON OPEN BUS PAD MOUNT SUBSTATION

Prior to any operation:

- The HV powder filled fuses are hinged at the top.
- HV fuses may be removed / replaced without an Access Authority under the following conditions:
  - HV fuses must be isolated and confirmed de-energised.
  - HV operating sticks must be used.

For all other access to the HV fuse chamber and open type bus an Access Authority is required.

- Access to the HV fuse chamber for any reason other than removal / replacement of the HV fuses requires an Access Authority.
- Removal / replacement of HV fuses without an Access Authority must be done with HV operating sticks with the HV fuses isolated and tested de-energised.

Functions:	Opening, Closing, Isolation, HV Fuses
Rating:	Various (HV Fuses)
Insulant:	Air
Voltage:	22 kV

Access to the HV Powder Filled Fuses Chamber

1 Open the HV enclosure access doors.

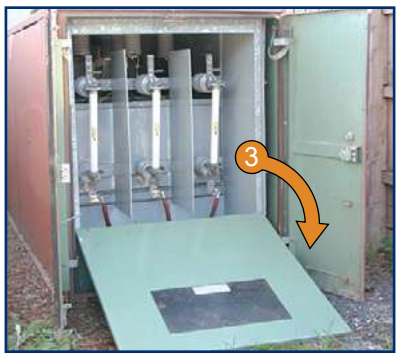
2 Unlock and slide across the two (2) HV fuse access door pad bolts.

3 Lower the access door as shown.

4 Replace the HV fuse(s) as required.

5 Raise and lock closed the HV fuse access door.

6 Close the HV enclosure access doors.



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WILSON PAD MOUNT KIOSK SUBSTATION MK2

Prior to any operation

- Some equipment in service are signed 'OFF' and 'ON' and some use 'OPEN' and 'CLOSED' as the ones photographed here.
- Check the oil level prior to switching and/or removal of the HV bayonet fuses.
- Ensure the transformer tank pressure is equalised via the bleed valve prior to removal of the HV bayonet fuses.
- Refer to the WILSON PAD MOUNT KIOSK SUBSTATION template in this manual for instructions on the removal / replacement of the HV bayonet fuses.
- Note that operating mechanisms may differ slightly, however the operating principles remain the same.
- Confirm the HV earth switch location and labeling prior to earthing.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Insulant:	Oil
Voltage:	22KV

Closing the HV Cable Switch

1 Confirm the HV switch operating mechanism interlock is locked in the correct position - across to the right - as shown.

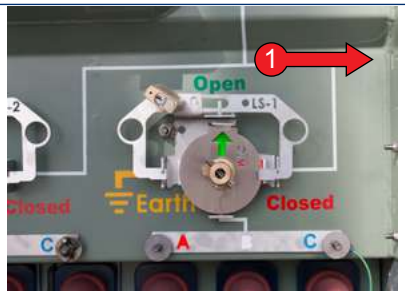
2 Attach the appropriate operating handle to the HV switch operating mechanism.

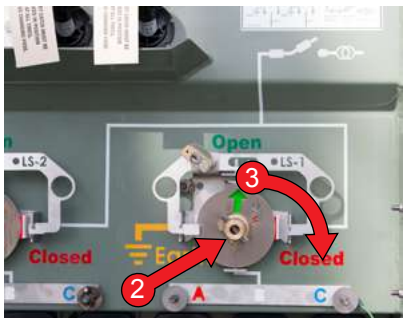
3 Rotate the operating handle CW app. 135 degrees past the closed position to **CLOSE** the HV switch.

4 Remove the operating handle.

5 Confirm the HV switch has closed correctly by the white arrow indicator pointing to 'CLOSED (On)'.

Note: *Confirm the interlock mechanism is locked in the corerct position prior to operating.*





WILSON PAD MOUNT KIOSK SUBSTATION MK2

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WILSON PAD MOUNT KIOSK SUBSTATION MK2 (CONTINUED)

Opening the HV Cable Switch

1 Confirm the HV switch operating mechanism interlock is locked in the correct position - across to the right - as shown.

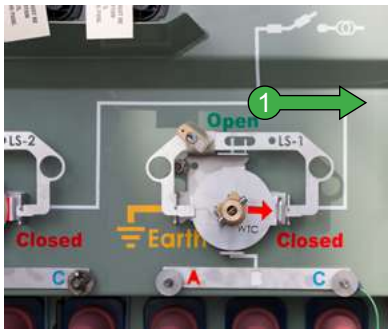
2 Attach the appropriate operating handle to the HV switch operating mechanism.

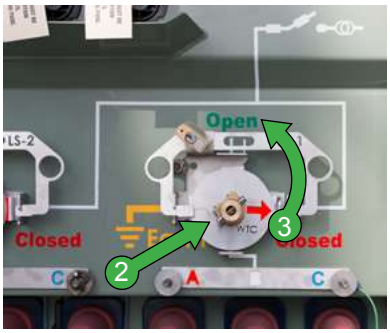
3 Rotate the operating handle ACW app. 135 degrees past the open position to **OPEN** the HV switch.

4 Remove the operating handle.

5 Confirm the HV switch has opened correctly by the green arrow indicator pointing to 'OPEN' (Off).

Note: *Confirm the interlock mechanism is locked in the corerct position prior to operating.*





Closing the HV Cable Earth Switch

1 Confirm the relevant HV switch is in the open position.

2 Carry out a 'Safe To Earth' test. Note: Neon indicating light bridges must be removed for neon test circuits to function correctly. The bridges must be replaced at the completion of the test.

3 Unlock and slide the operating mechanism interlock across to the left as shown.

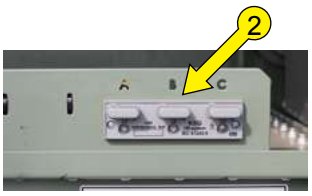
4 Attach the appropriate operating handle to the HV switch operating mechanism.

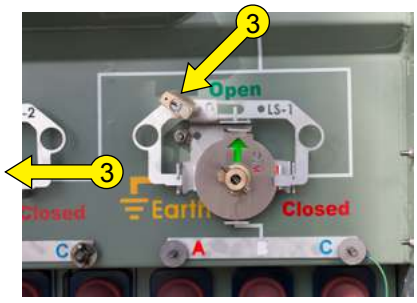
5 Rotate the operating handle ACW app. 135 degrees to the stop position to **CLOSE** the HV switch to the earth position. Remove the operating handle.

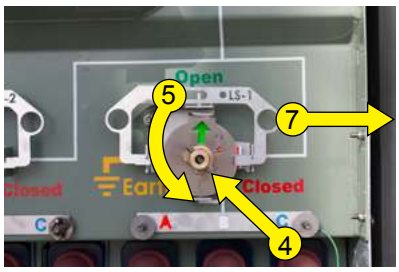
6 Confirm the HV earth switch has closed correctly by the white arrow pointing to 'EARTH'

7 Slide the interlock to the right and lock if required.

Note: *Confirm the remote end of the HV cable is isolated prior to earthing.*







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WILSON PAD MOUNT KIOSK SUBSTATION MK2 (CONTINUED)

Opening the HV Cable Earth Switch

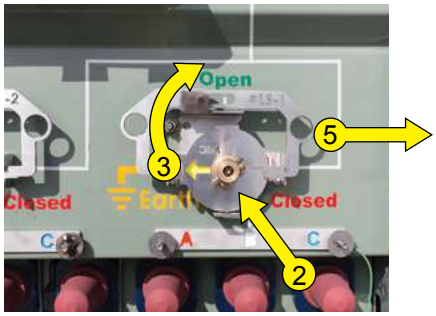
1 Unlock if required and slide the operating mechanism interlock across to the left.

2 Attach the appropriate operating handle to the HV earth switch operating mechanism.

3 Rotate the operating handle CW app. 135 degrees past the open position to OPEN the HV earth switch.

4 Confirm the HV switch has opened correctly by the green arrow indicator pointing to 'OPEN' (Off).

5 Slide the operating mechanism interlock across to the right and lock in this position.



Note: *Ensure the operating mechanism interlock is moved to the right and locked after opening the HV Earth Switch.*

Removal/Replacement of the HV Bayonet Fuses

Refer to the Wilson Pad Mount Kiosk Substation template in this manual.

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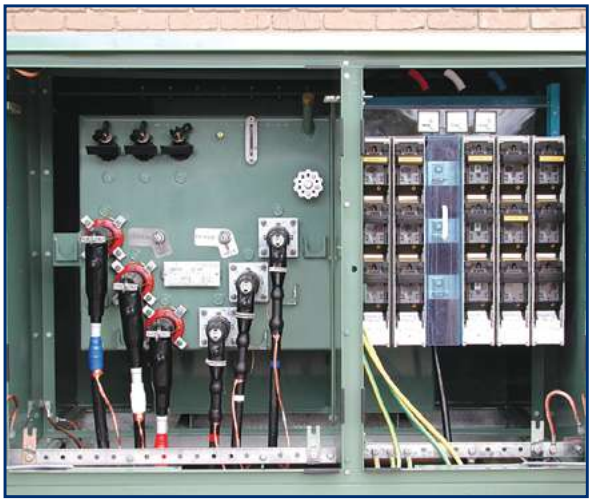
WILSON SUBSTATION

Prior to any operation:

- Check oil level prior to switching and / or removal of HV bayonet fuses.
- Ensure the transformer tank pressure is equalized via the bleed valve prior to removal of the HV bayonet fuses.
- For the removal / earthing of the 200/400A elbows refer to the '200/400A Cable Connector Elbows' template in this manual.
- Confirm switch location and labelling prior to operation.
- Ensure HV fuses are kept clean at all times.
- HV bayonet fuses MUST NOT be used to de-energise or energise transformers.

Functions:	Opening, Closing, HV Fuses
Rating:	Various
Insulant:	Oil
Voltage:	22kV, 11kV

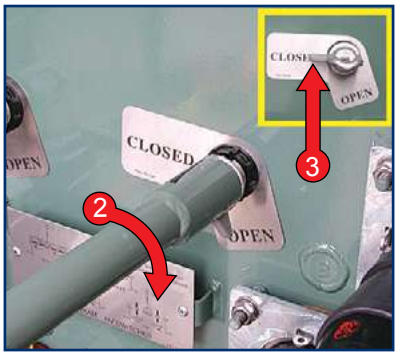


Closing HV Cable Switch

1 Place the operating handle onto HV switch operating mechanism.

2 Rotate operating handle **CW** to the stop position to **CLOSE** the HV switch.

3 Confirm HV switch has closed correctly via indicator.

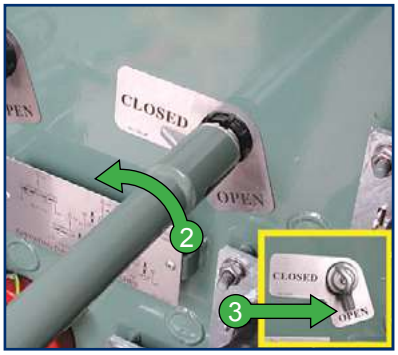


Opening HV Cable Switch

1 Place the operating handle onto HV switch operating mechanism.

2 Rotate operating handle **ACW** to the stop position to **OPEN** the HV switch.

3 Confirm HV switch has opened correctly via indicator.



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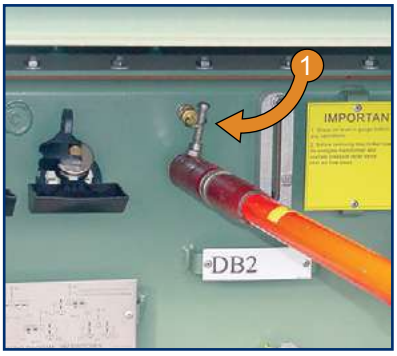
WILSON SUBSTATION (CONTINUED)

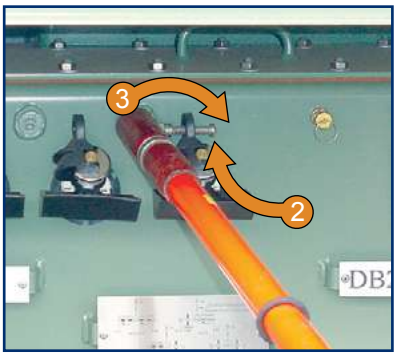
Removing the HV Bayonet Fuses

1 Using a HV operating stick or HV operating gloves, pull the pressure relief valve for a minimum of ten (10) seconds to equalize the transformer tank pressure with the external air pressure.



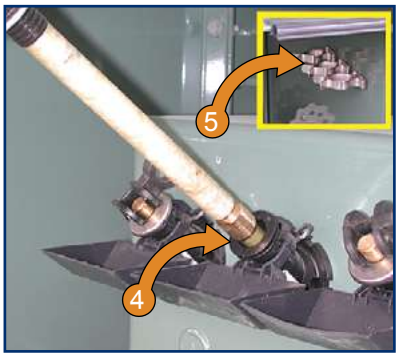
2 Insert the HV operating stick eye bolt into the HV bayonet fuse removal eye as shown.

3 Rotate the HV bayonet fuse locking clamp 180 degrees **CW**



4 Withdraw the HV fuse in a positive manner until the brass contacts appear then pause to allow excess oil to drain into the drip tray. Stand to one side when withdrawing the HV bayonet fuses.
Ensure HV bayonet fuses are kept clean at all times.

5 Remove the HV fuse and, if required, store on the supplied mounting clips as shown.



Replacing the HV Bayonet Fuse Element

1 Remove the HV fuse assembly end cap.

2 Remove fuse element holder from the insulated tube.

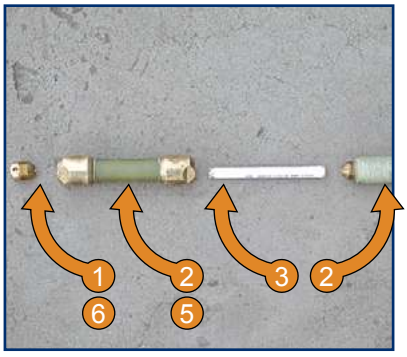
3 Remove the fuse element.

4 Insert the new fuse element.

5 Reattach the fuse element holder to the insulated tube.

6 Reattach the end cap to the HV fuse assembly.

Note: *Ensure HV fuses are kept clean at all times.*



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WILSON SUBSTATION (CONTINUED)

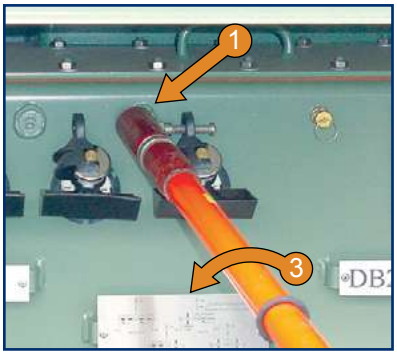
Replacing the HV Bayonet Fuses

1 Insert the HV bayonet fuse by using the operating stick.

2 Push the HV bayonet fuse firmly home.

3 Rotate the HV bayonet fuse locking pin **ACW** to lock the HV fuse into position.

4 Confirm the HV bayonet fuse is latched correctly.



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WILSON SWITCH LINK

Prior to any operation:

- Prior to switching check HV switch oil level gauge.
- NX type HV fuses can only be removed or replaced with sub station de-energised. For instruction on removal / replacement refer to 'NX HV Fuses' section of this manual.
- For cable elbow operation refer to '200/400 or 600A Cable Elbows' section of this manual.
- Confirm switch location and labelling prior to operation.

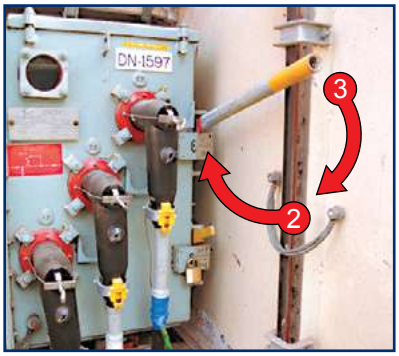
Functions:	Opening, Closing, Isolation, Earthing, HV Fuses
Rating:	400 amps
Insulant:	Oil
Voltage:	22kV

Closing HV Cable Switch

1 Place operating handle on HV switch open / close operating mechanism.

2 Open operating mechanism interlock flap.

3 Lower handle to **CLOSE** the HV switch.

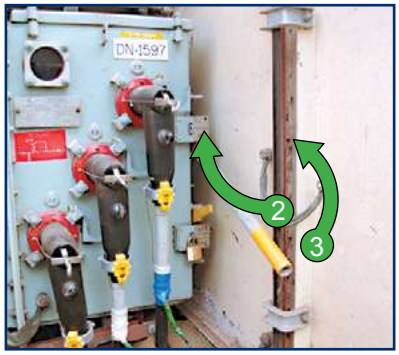


Opening HV Cable Switch

1 Place operating handle on HV switch open / close operating mechanism.

1 Open operating mechanism interlock flap.

2 Raise handle to **OPEN** the HV switch.



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WILSON SWITCH LINK (CONTINUED)

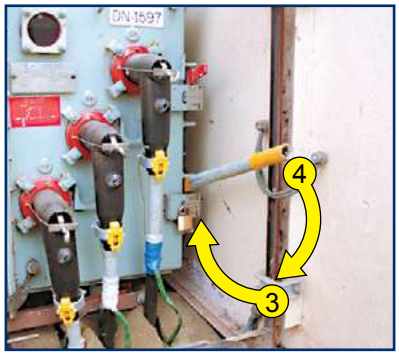
Earthing of HV Cable

1 Carry out Safe to Earth test.

2 Place operating handle on HV earth switch operating mechanism.

3 Open operating mechanism interlock flap.

4 Lower handle to **CLOSE** the HV earth switch.



Note: *Ensure remote end of incoming cable to be earthed is isolated.*

Note: *To open the HV earth switch, raise the handle.*

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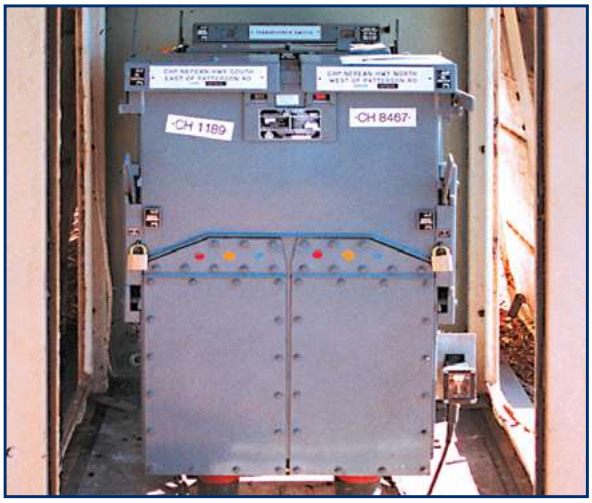
YORKSHIRE TYKE

Prior to any operation:

- Confirm HV switchgear is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.
- Access Authority required for access to HV fuses.

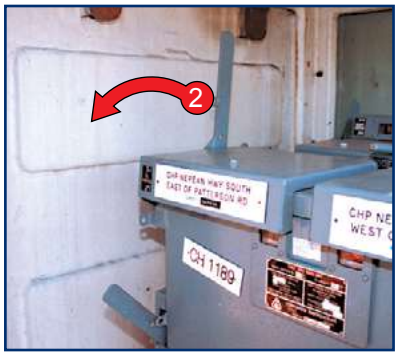
Functions:	Opening, Closing, Trans Switch/ CD, Earthing, HV Fuses
Rating:	630 amps
Insulant:	Oil
Voltage:	11kV



Closing HV Cable Switch

1 Pull operating handle forward to **CLOSE** HV switch.

2 Confirm semaphore agrees with switch status.



Opening HV Cable Switch

1 Push operating handle backwards to **OPEN** HV switch.

2 Confirm semaphore agrees with switch status.

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YORKSHIRE TYKE (CONTINUED)

Earthing of HV Cable

1 Unlock and open the HV earth switch interlock flap.

2 Lower the HV earth switch operating handle to **CLOSE** HV earth switch.

3 Confirm semaphore agrees with switch status.

Closing HV Transformer Switch

1 Pull transformer HV switch operating handle forward to **CLOSE** transformer HV switch.

2 Confirm semaphore agrees with switch status.

Opening HV Transformer Switch

1 Push transformer HV switch operating handle backwards to stop position to **OPEN** transformer HV switch and charge closing spring.

2 Confirm semaphore agrees with switch status.

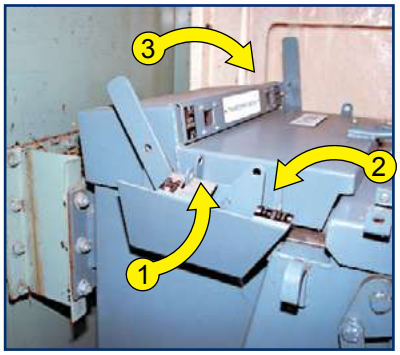
Earthing of Transformer HV Cable

1 Unlock and open the transformer HV earth switch interlock flap.

2 Push transformer earth switch selector lever to 'Earth' position.

3 Pull transformer HV earth switch operating lever to **CLOSE** transformer HV earth switch.

4 Confirm semaphore status.



Note: *If unable to carry out Safe to Earth test at HV switch unit do so at transformer LV connections.*

Note: *to open the transformer HV earth switch, push the operating lever.*

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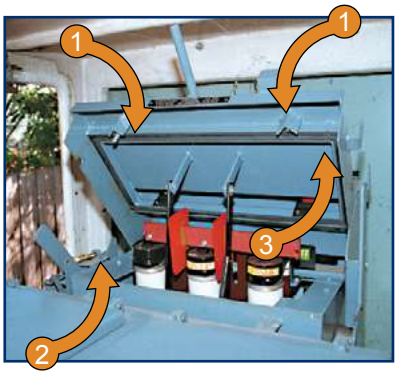
YORKSHIRE TYKE (CONTINUED)

Access to HV Fuses

1 With transformer HV earth switch closed unscrew two (2) HV fuse access cover plate bolts.

2 Close the transformer HV earth switch interlock flap.

3 Raise HV fuse access cover to stop position to gain access to HV fuses.



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YORKSHIRE YSF6

Prior to any operation:

- If equipped with a gas indication gauge check for correct pressure prior to switching.
- Confirm HV CB location and labelling prior to operation.
- Confirm HV CB location and labelling prior to operation.

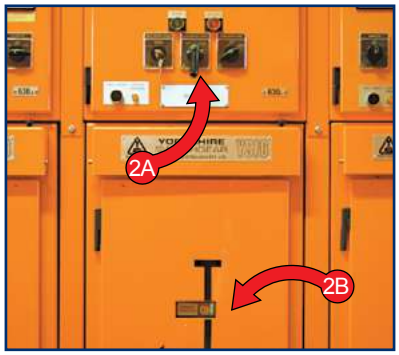
Functions:	Opening, Closing, Racking, Trans Switch/CB, Earthing
Rating:	630 amps
Insulant:	SF6
Voltage:	22kV, 11kV

Closing CB

1 Check semaphore for 'Springs Charged' indication.

2 A. For electrical close, turn CB control lever **CW** to CLOSE CB.
B. For mechanical close, OPEN the CB cover panel and lift the CB 'Close' lever.

3 Confirm semaphore / indicating lights.

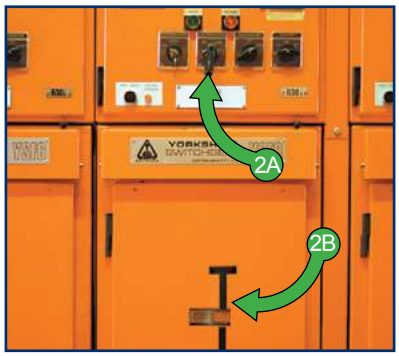


Opening CB

1 Check semaphore for 'Springs Charged' indication.

2 A. For electrical open turn CB control lever **ACW** to trip CB.
B. For mechanical open, OPEN the CB cover panel and lower the CB 'Trip' lever.

3 Confirm semaphore / indicating lights.



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YORKSHIRE YSF6 (CONTINUED)

Racking Out CB

1 Lift the interlock button and **OPEN** the racking mechanism access shutter.

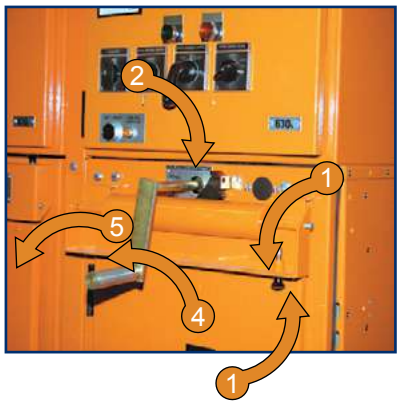
2 Push the selector lever **ACW** to the 'Free' position.

3 Insert the racking handle into the winding mechanism.

4 Rotate the handle **ACW** until CB ceases racking.

5 Remove the racking handle and withdraw the CB from its service position.

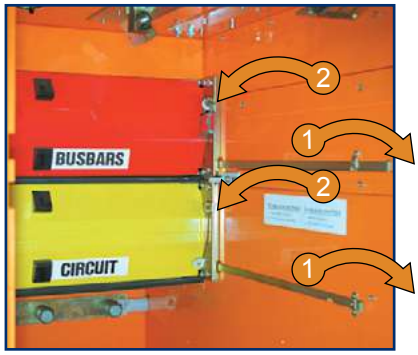
Note: *Ensure HV CB is open prior to racking.*



Locking Shutters

1 Pull shutter locking levers to the latched position.

2 Place padlock through eye-holes at the shutter position.



Racking In CB

1 Rotate the selector lever **ACW** to stop position.

2 Push CB into CB cubicle to the first stop position.

3 Rotate the selector lever **CW** to the 'Free' position.

4 Push the CB to the second stop position.

5 Insert the racking handle into the winding mechanism.

6 Rotate handle **CW** until CB is in the final service position.

7 Remove the racking handle and move the selector lever to the 'Lock' position.

8 **CLOSE** the racking mechanism access shutter.

Note: *Ensure CB is open prior to racking in.*
Ensure shutter padlocks have been removed prior to racking in the HV CB.

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2 of 3

YORKSHIRE YSF6 (CONTINUED)

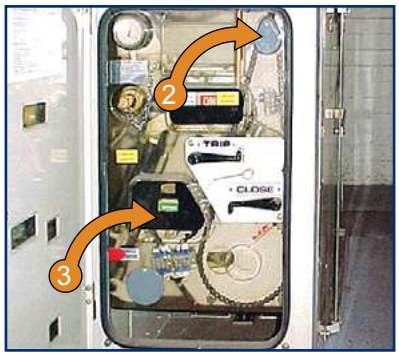
Charging CB Closing Spring

1 Check ratchet on spring charge handle is set to drive clockwise.

2 Open CB cover panel then rotate open the spring charge mechanism access flap and fit spring charge handle to spring charging spigot.

3 Raise and lower the spring charge handle until resistance to movement occurs, then gives way, and then stops as the ‘Spring Charged’ condition is reached.

4 Remove the spring charge handle and CLOSE CB cover.



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CONTENTS

HV OUTDOOR

ABB D221V/1C GANG EZY BREAK
ABB DUOGAP SIDE BREAK SWITCH
ABB GAS SWITCH
ABB INTELLICAP LINE CAPACITOR
ABB SWER SECTIONASIER
AEM SLB SUSPENSION ISOLATORS
BORIC ACID HV FUSES
COOPER MAGNEX CB/SWITCH SINGLE PHASE, SWER AND 3 PHASE
DUCON LINE CAPACITOR
DUO GAP/EZY BREAK - 2 POST – LOAD INTERRUPTER
DUO GAP/EZY BREAK - 3 POST – LOAD INTERRUPTER
EDO HV FUSES
GAC (GANG ARC CHUTE) - 2 POST
GAC (GANG ARC CHUTE) - 3 POST
GANG ISOLATORS
GEVEA HOLEC GANG AIR BREAK SWITCH
GFB (GANG FLICKER BLADE)
HAYCOLEC SECTIONALISER TYPE 0-04
HD (HORN DEFLECTOR) SWITCH
HV ISOLATORS
ILJIN GAS SWITCH
IT-GANG OPERATED EDO FUSES
KYLE E ACR - SINGLE PHASE
LEXINGTON SWER ACR
LM RV ACR
LOADBUSTER
MERLIN GERIN PM6
NGK GAS SWITCH (AUTOMATABLE)
NGK GAS SWITCH (MANUAL)
NGK MK GAS SWITCH
NOVA ACR
NULEC ACR
NULEC L24 GAS SWITCH / SECTIONALISER
NULEC RL LOAD BREAK SWITCH / SECTIONALISER
POWDER FILLED HV FUSES
REYROLLE OYT ACR
RV ACR
RVE/VWVE ACR
S & C FAULT TAMER
SCHNEIDER (NULEC) RL 27 GAS SWITCH
SIDE THROW GAC
SIEMENS 3AD8 FUSESAVER & SWER ACR OCO
SIEMENS PORTABLE MID SPAN GANGED SWITCH
SINGLE PHASE ARC CHUTE SWITCH
STANGER MID SPAN ISOLATORS
TRINETICS VACUUM SWITCH
WHIPP & BOURNE ACR

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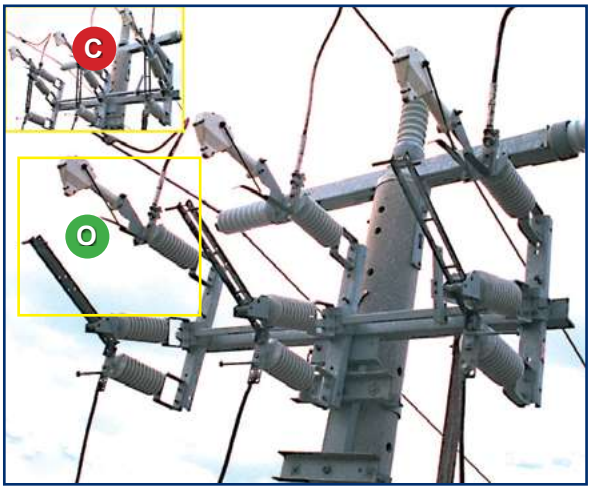
ABB D221V/1C GANG EZY BREAK

Prior to any operation:

- Confirm HV switch is fit for service prior to and after operation.
- Operating handles may differ in construction however operating principles remain the same.
- Confirm switch location and labelling prior to operation.

Functions: Opening, Closing
Rating: 630 amps
Insulant: Air
Voltage: 22kV



Closing HV Switch

1 Remove operating handle padlock.

2 Lower operating handle firmly to stop position to **CLOSE** HV switch.

3 Confirm HV switch is closed and latched correctly.

Opening HV Switch

1 Remove operating handle padlock.

2 Raise operating handle firmly to stop position to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.

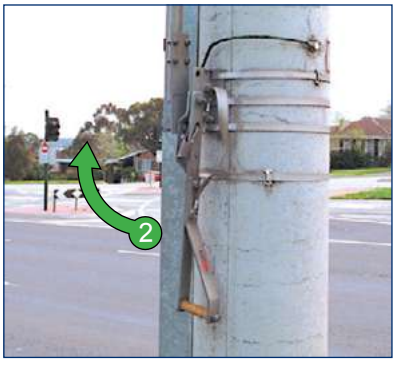


ABB D221V/1C GANG EZY BREAK

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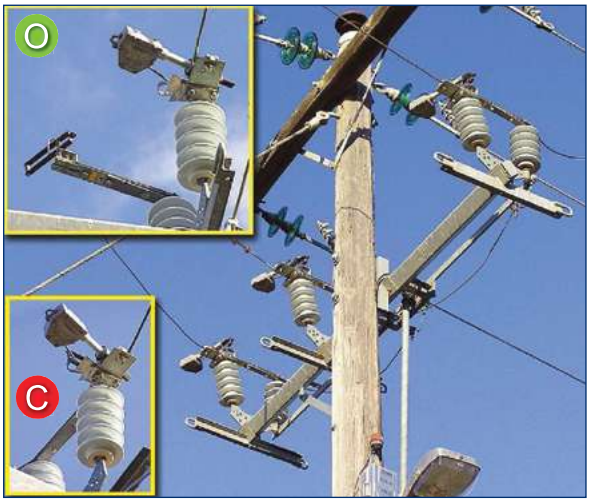
ABB DUOGAP SIDE BREAK SWITCH

Prior to any operation

- Confirm the HV switch is fit for service prior to and after any operation.
- The operating handles on this HV switch may differ in construction however the operating principles remain the same.
- Confirm the Duogap arc expulsion devices have latched correctly prior to opening the HV switch.
- Check/confirm labelling
- Confirm the HV switch location and labelling prior to operation.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	400 Amps
Insulant:	Air
Voltage:	22 kV

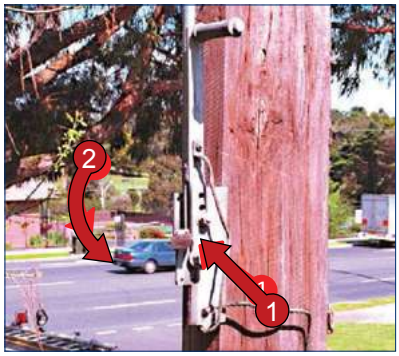


Closing the HV Switch

1 Remove the operating handle padlock.

2 Lower the operating handle firmly to the stop position to close the HV switch.

3 Confirm the HV switch has close and the Duogap arc expulsion mechanisms have latched correctly.



Duogap Latching

1 Prior to opening the HV switch, confirm the Duogap arc expulsion devices have latched correctly as shown.

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ABB DUOGAP SIDE BREAK SWITCH (CONTINUED)

Opening the HV Switch

1 Remove the operating handle padlock.

2 Raise the operating handle firmly to the stop position to open the HV switch.

3 Confirm the HV switch has opened correctly.

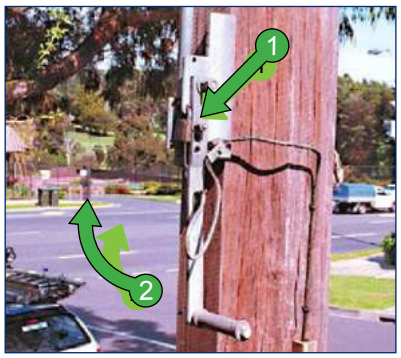

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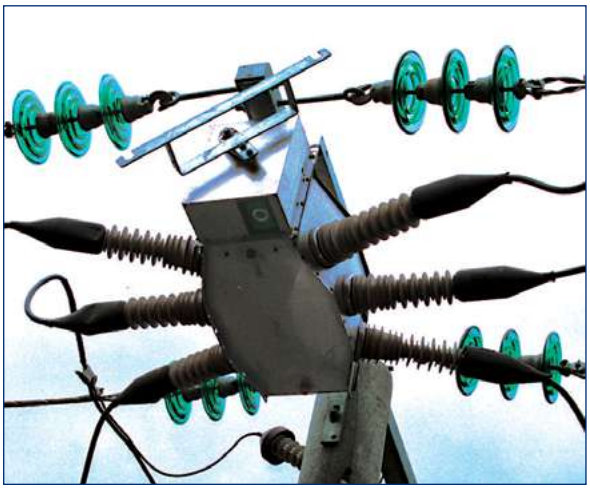
ABB GAS SWITCH

Prior to any operation:

- If 'Gas Low' semaphore appears in semaphore window do not operate gas switch.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	630 amps
Insulant:	SF6
Voltage:	22kV, 11kV, 6.6kV

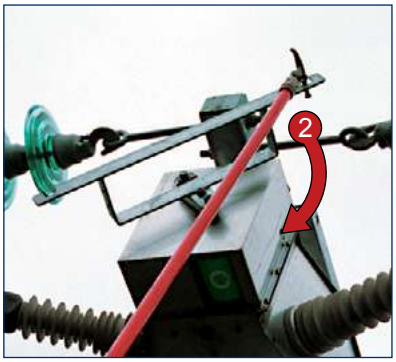


Closing HV Switch

1 Place HV operating stick on the end of HV switch operating mechanism lever as shown.

2 Pull down operating mechanism lever to stop position to **CLOSE** HV switch.

3 Confirm semaphore agrees with switch status.



Opening HV Switch

1 Place HV operating stick on the end of HV switch operating mechanism lever as shown.

2 Pull down operating mechanism lever to stop position to **OPEN** HV switch.

3 Confirm semaphore agrees with switch status.

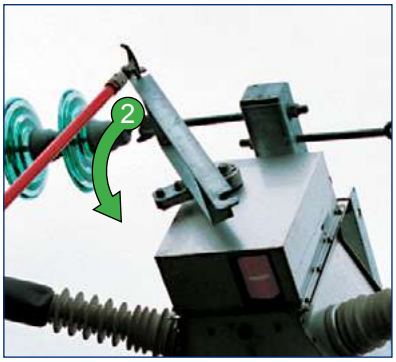


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ABB INTELLICAP LINE CAPACITOR

Functions: Opening, Closing, Earthing, HV Fuses
Rating: MVar
Insulant: Oil / Vacuum
Voltage: 22 kV

Prior to any operation

- AT ALL TIMES a period of at least five (5) minutes must be allowed to elapse between the capacitor modules being switched off and the application of earths to the discharge terminals.
- The hinged HV fuse MUST NOT be used to make or break the capacitor current.
- Confirm the capacitor location and labelling prior to operation.
- Check/confirm labelling and semaphores
- The close/open sequence can be cancelled by momentarily moving the 'AUTO / MANUAL' control switch to 'AUTO' and back to 'MANUAL'.
- Note: The preferred method of switching is via the control box. Manual vacuum switch operation is to be used only if AC supply is unavailable to the control box.
- In some cases the 16 Kva transformer must be de-energised for proximity reasons before the capacitors can be earthed.

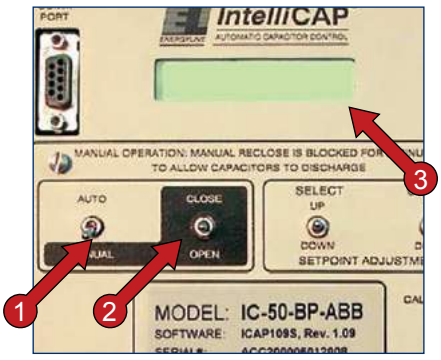
Closing Capacitors Manually – Control Box

1 Switch the 'AUTO / MANUAL' switch to the 'MANUAL' position.

2 Momentarily move the 'CLOSE / OPEN' switch to the **CLOSE** position.

3 Confirm countdown to close sequence on the LCD display- (close in 30 seconds).

4 Move away from the capacitors until closed.



Opening Capacitors Manually – Control Box

1 Switch the 'AUTO / MANUAL' switch to the 'MANUAL' position.

2 Momentarily move the 'CLOSE / OPEN' switch to the **OPEN** position.

3 Confirm countdown to open sequence on the LCD display- (open in 30 seconds).

4 Move away from the capacitors until open.

Note: *After opening, the control box will not allow a reclose for 5 minutes.*

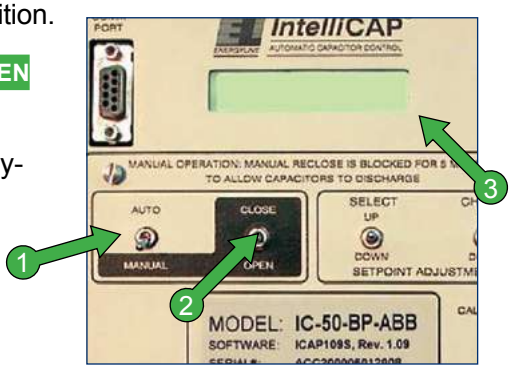


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ABB INTELLICAP LINE CAPACITOR (CONTINUED)

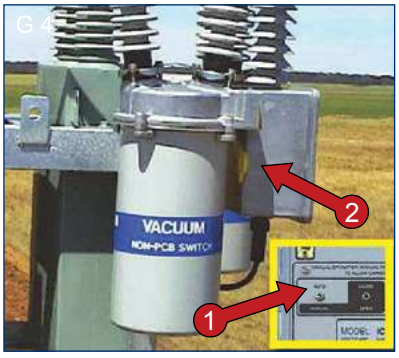
Closing the Capacitors Manually – Vacuum Switch

1 Switch the 'AUTO / MANUAL' switch to the 'MANUAL' position.

2 Place the operating stick pin under the yellow operating lever.

3 Gently push the operating lever up to the stop position to CLOSE the capacitor vacuum switch.

4 Repeat this procedure for all three (3) phases of the capacitor.



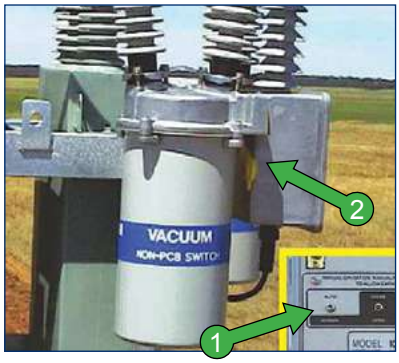
Opening the Capacitors Manually – Vacuum Switch

1 Switch the 'Auto/manual' switch to the 'MANUAL' position

2 Place the operating stick pin over the yellow operating lever.

3 Gently lower the operating lever to the stop position to OPEN the capacitor vacuum switch.

4 Repeat this procedure for all three (3) phases of the capacitor.



Discharging / Earthing Capacitors

1 Open the capacitors via the control box as previously described.

2 Confirm the vacuum switches are open - yellow levers (3) in the down position.

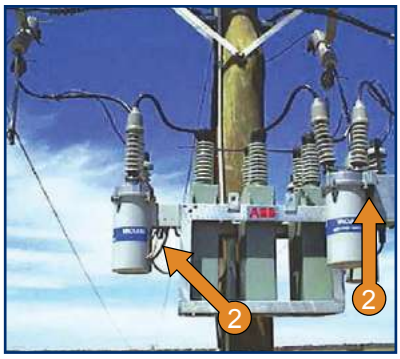
3 Wait for five (5) minutes then confirm, using a Modiewark Tester, that each phase of the capacitor has been de-energised by the vacuum switches.

4 Open the three (3) capacitor boric acid HV fuses.

5 Close the three (3) vacuum switches.

6 Test and apply earth and short circuits to the capacitor discharge bar.

7 Test and apply earth and short circuits to the capacitor side of the boric acid HV fuses.



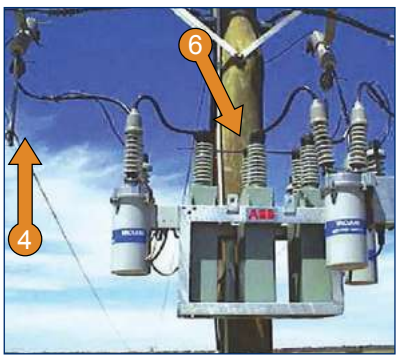


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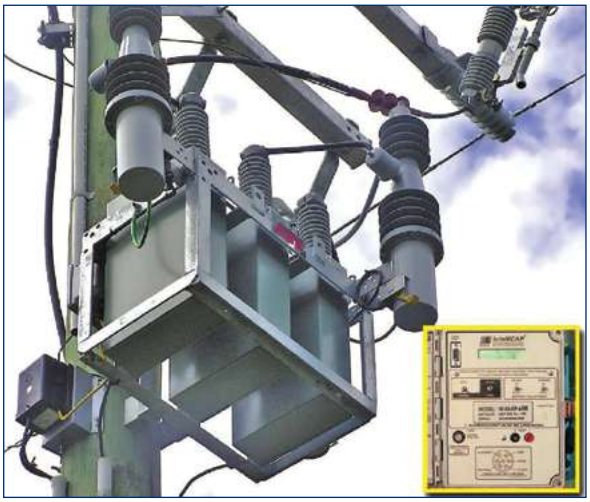
ABB INTELLICAP LINE CAPACITOR MK2

Prior to any operation

- At all times a period of at least five (5) minutes must be allowed to elapse between the capacitor modules being switched off and the application of earths to the discharge terminals.
- The hinged HV fuse MUST NOT be used to make or break the capacitor current.
- Confirm the capacitor location, labelling and semaphores
- The close/open sequence can be cancelled by momentarily moving the 'AUTO / MANUAL' control switch to 'AUTO' and back to 'MANUAL'.
- After opening, the control box will not allow a reclose for 5 minutes.
- Note the preferred method of switching is 3 phase via the control box. Manual vacuum
- switch operation is to be used only if AC supply is unavailable to the control box..

Functions:	Opening, Closing, Earthing, HV Fuses
Rating:	MVar
Insulant:	Oil / Vacuum
Voltage:	22kV



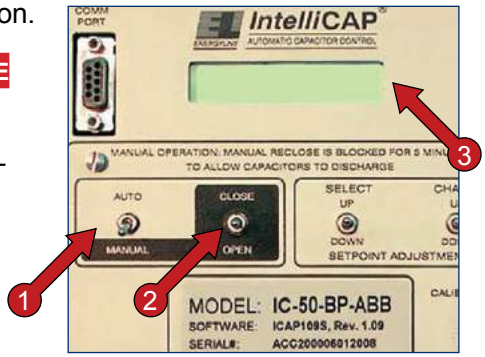
Closing Capacitors Manually – Control Box

1 Switch the 'AUTO / MANUAL' switch to the 'MANUAL' position.

2 Momentarily move the 'CLOSE / OPEN' switch to the **CLOSE** position.

3 Confirm countdown to close sequence on the LCD display- (close in 30 seconds).

4 Move away from the capacitors until closed.



Opening Capacitors Manually – Control Box

1 Switch the 'AUTO / MANUAL' switch to the 'MANUAL' position.

2 Momentarily move the 'CLOSE / OPEN' switch to the **OPEN** position.

3 Confirm countdown to open sequence on the LCD display- (open in 30 seconds).

4 Move away from the capacitors until open.

Note: *The open sequence can be cancelled by momentarily moving the 'AUTO / MANUAL' control switch to 'AUTO' and back to 'MANUAL'.*

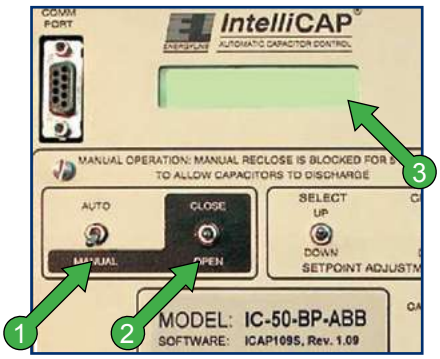


ABB INTELLICAP LINE CAPACITOR MK2

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ABB INTELLICAP LINE CAPACITOR MK2 (CONTINUED)

Closing the Capacitors Manually – Vacuum Switch

1 Switch the 'AUTO / MANUAL' switch to the 'MANUAL' position.

2 Place the operating stick pin under the yellow operating lever.

3 Gently push the operating lever up to the stop position to CLOSE the capacitor vacuum switch.

4 Repeat this procedure for all three (3) phases of the capacitor.

Opening the Capacitors Manually – Vacuum Switch

1 Switch the 'Auto/manual' switch to the 'MANUAL' position

2 Place the operating stick pin over the yellow operating lever.

3 Gently lower the operating lever to the stop position to OPEN the capacitor vacuum switch.

4 Repeat this procedure for all three (3) phases of the capacitor.

Discharging / Earthing Capacitors

1 Open the capacitors via the control box as previously described.

2 Confirm the vacuum switches are open - yellow levers (3) in the down position.

3 Wait for five (5) minutes then confirm, using a Modiewark Tester, that each phase of the capacitor has been de-energised by the vacuum switches.

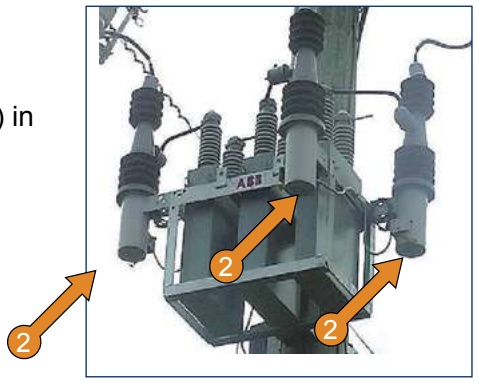
4 Open the three (3) capacitor boric acid HV fuses.

5 Close the three (3) vacuum switches.

6 Test and apply earth and short circuits to the capacitor discharge bar.

7 Test and apply earth and short circuits to the capacitor side of the boric acid HV fuses.

Note: *If access is required to the HV Transducer Insulator or HV Transducer Insulator leads, a G&B crew is required to remove the HV OH conductor out of the Transducer Insulator or an EAP needs to be on issue on the HV OH line prior to access.*



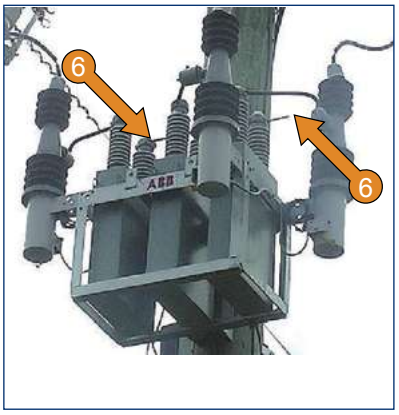


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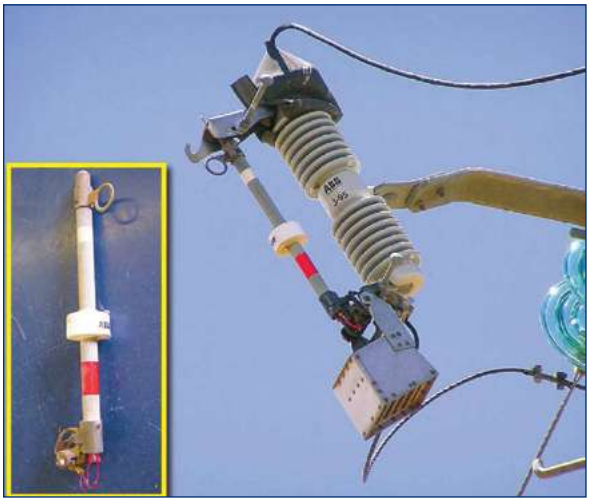
ABB SWER SECTIONASIER

Prior to any operation

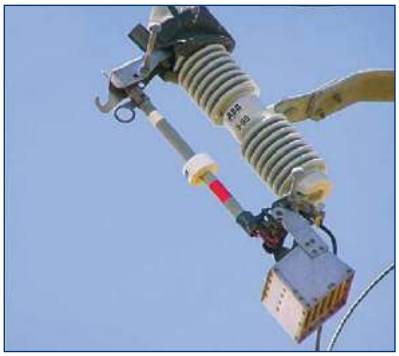
- For instructions on opening and closing this unit refers to the EDO HV FUSES section in this manual.
- Check/confirm labelling and semaphores
- Exercise caution when handling the sectionaliser as it may be hot.
- Do not bend the spade terminals when removing and re-attaching the connectors.

Functions:	Opening, Closing, HV Fuses
Rating:	0 -15Amps
Insulant:	Air
Voltage:	22 kV



Opening / Closing / Removing the Sectionaliser

Refer to the EDO HV FUSES template of this manual for instructions on Opening/Closing/Removing the sectionaliser.



Opening the Sectionaliser Operating Trundle

1 Pull the firing pin mounting block in the direction as shown to release the trundle latch.

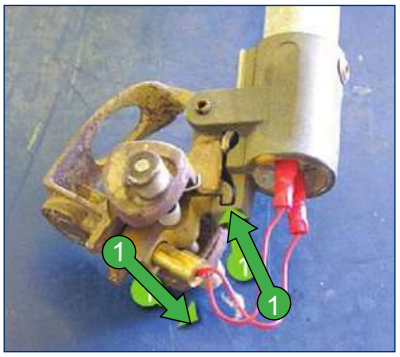


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ABB SWER SECTIONASIER (CONTINUED)

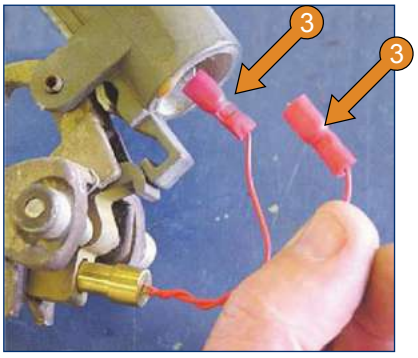
Replacing the Sectionaliser Firing Pin

1 Remove the two (2) spade terminal connectors as shown.

2 Unscrew the firing pin.

3 Screw in the replacement firing pin as shown. Be careful not to over tighten.

4 Reattach the two (2) spade terminal connectors as shown.. Be careful not to bend the spades.

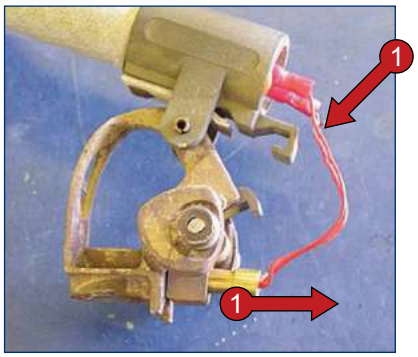


Closing the Sectionaliser Operating Trundle

1 Pull the firing pin mounting block in the direction as shown then rotate the trundle to the latch position then release the firing pin mounting block.

2 Confirm the firing pin latch has engaged correctly.

3 After closing the trundle ensure the firing pin latch has engaged correctly.



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AEM SLB SUSPENSION ISOLATORS

Functions: Opening, Closing
Rating: 800 amps
Insulant: Air
Voltage: 22 kV

Prior to any operation

- Confirm the suspension cable isolators are fit for service prior to and after any operation.
- Care should be taken to prevent excessive conductor swing when opening and closing the suspension cable isolators.
- Confirm the suspension cable isolators have latched correctly after closing.
- These suspension cable isolators are not to be used to break load. They can only be used to de-energise the HV cable up to the first switching point.
- Confirm the suspension cable isolators location and labelling prior to any operation.
- Where applicable confirm the HV cable is isolated at the remote end prior to opening the isolators.

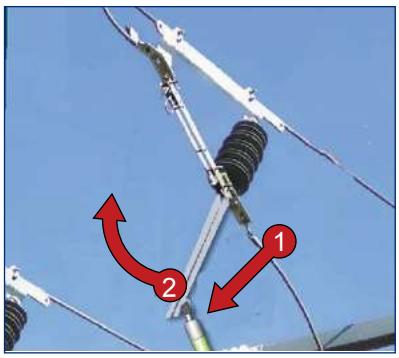
Closing the Suspension Cable Isolator

1 Place the HV operating stick pin in the suspension cable Isolator operating eye hole.

2 Raise the suspension cable Isolator and push firmly CLOSED as shown. Avoid excessive conductor swing when closing.

3 Remove the HV operating stick.

4 Confirm the suspension cable isolator has latched correctly.



Opening the Suspension Cable Isolator

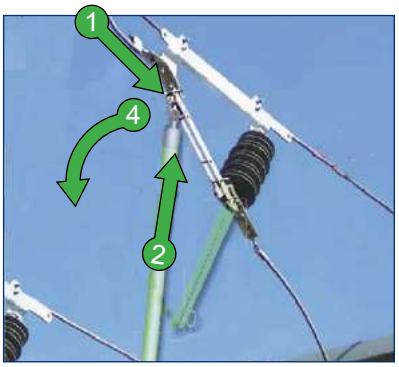
1 Place the HV operating stick pin in the suspension cable Isolator operating eye hole.

2 Push up the suspension cable Isolator to release pressure on the latching mechanism.

3 'Crack /Inch' the suspension cable isolator OPEN and if in order...

4 ...pull open the suspension cable isolator. Avoid excessive conductor swing when opening.

5 Remove the HV operating stick.



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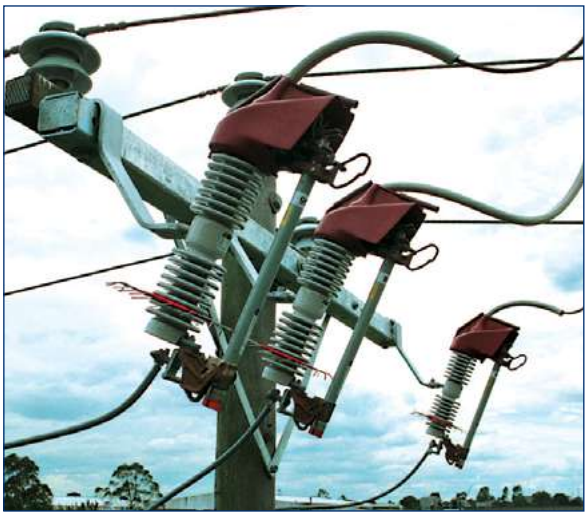
BORIC ACID HV FUSES

Prior to any operation:

- After removing HV fuses care should be taken prior to handling as fuses may be hot.
- Boric Acid Fuses should not be left hanging in the open position if moisture could enter the exhaust end of the fuse thus affecting the fuse performance.
- Ensure HV stick movement maintains pressure on HV Fuse lower hinged fitting during opening and closing.
- Warning: HV fuse may be hot.

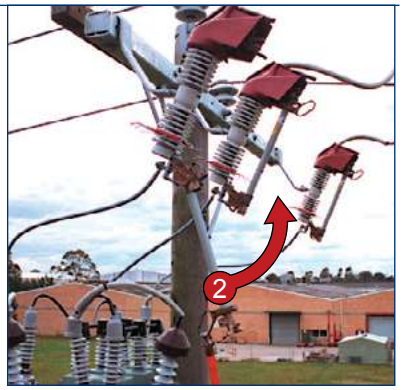
Functions:	Opening, Closing, HV Fuses
Rating:	Various
Insulant:	Air
Voltage:	22kV, 11kV, 6.6kV



Closing HV Fuse

1 Place HV operating stick pin in HV Fuse operating eye hole.

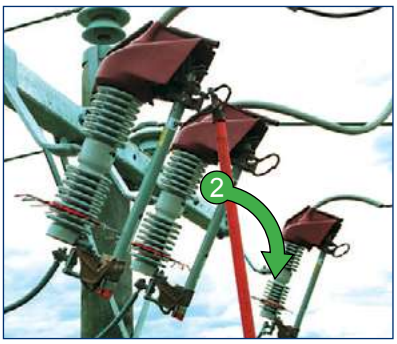
2 Raise HV fuse and push firmly **CLOSED**.



Opening HV Fuse

1 Place HV operating stick pin in HV Fuse operating eye hole.

2 'Crack / inch' **OPEN** HV fuse and if in order fully lower HV fuse.



Removing HV Fuse

1 With HV Fuse in the open position place HV operating stick pin in HV fuse hinge operating eye hole.

2 Lift HV fuse out of hinge mechanism and remove.

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COOPER MAGNEX CB/SWITCH SINGLE PHASE, SWER AND 3 PHASE

Prior to any operation:

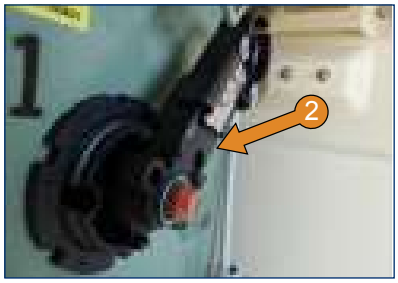
- Contact the Control Centre.
- Confirm HV CB/Switch location and labelling prior to operation.
- Opening and closing only requires 2kg of force to operate CB/Switch handle.
- Can be locked open but not to be locked closed.
- All are an overcurrent CB/Switching device
- Use HV Operating handle with Operating Gloves, Mat and/or Sleeve

Functions:	Opening, Closing and Fault Interruption
Rating:	Interrupting 600A, Continuous 42A
Insulant:	Oil with Magnetic interrupter
Voltage:	22kV and 12.7kV

Opening the CB/Switch (With Semphore)

1 Place operating handle into the CB/switch mechanism and turn slowly using very little force anti clockwise to stop point to **OPEN**.

2 Ensure the semphore has operated via the red indicator and switch is in the open position.



3 Prove de-energised by approved testing means on outgoing cable and/or neon indicators.

Note: *CB/Switch cannot be used as an isolation point for an EAP*

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COOPER MAGNEX CB/SWITCH SINGLE PHASE, SWER AND 3 PHASE (CONTINUED)

Closing the CB/Switch (With Semphore)

1 Place operating handle into CB/switch mechanism and turn slowly with very little force Clockwise to stop point to **CLOSE**.

2 Ensure the semphore has retracted and handle is in the closed position.

3 Prove energised by the red neon indicator.

Opening the CB/Switch (With NO Semphore)

1 Place operating handle into the CB/switch mechanism and turn slowly using very little force anti clockwise to stop point to **OPEN**.

2 Prove de-energised by approved testing means by outgoing cable and/or neon indicator and confirm switch is in the open position.

Note: *CB/Switch cannot be used as an isolation point for an access authority.*

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COOPER MAGNEX CB/SWITCH SINGLE PHASE, SWER AND 3 PHASE (CONTINUED)

Closing the CB/Switch (With No Semphore)

1 Place operating handle into CB/switch mechanism and turn slowly with very little force clockwise to stop point to **CLOSE**.

2 Test to prove energised by by approved testing means by testing the outgoing cable and/or neon indicators and confirm switch is in the closed position.

Re-setting the CB/Switch after a Fault (With Semaphore)

When *an overcurrent fault occurs, the CB handle will remain in the closed position. The semaphore will be visible.*

1 Contact the System Control prior to operating.

2 Check to confirm if semaphore is visable.

3 Place operating handle into CB/Switch mechanism and turn slowly with very little force.anti-clockwise to stop point at open position.

4 Ensure the semphore has retracted. This has re-set the internal fault mechanism.

5 When instruction is given, rotate handle with very little force Clockwise to energise.

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COOPER MAGNEX CB/SWITCH SINGLE PHASE, SWER AND 3 PHASE (CONTINUED)

Re-setting the CB/Switch after a Fault (With No Semaphore)

When *an overcurrent fault occurs, the CB handle will remain in the closed position.*

1 Contact the System Control prior to operating.

2 Prove de-energised by approved testing means and/or that neon indicators are not illuminated.

3 Place operating handle into CB/Switch mechanism and turn slowly with very little force anti-clockwise to stop point at open position.

4 This has re-set the internal fault mechanism.

5 When instruction is given, rotate handle with very little force clockwise to energise.

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DUCON LINE CAPACITOR

Functions:	Opening, Closing, Earthing, HV Fuses
Rating:	400 KVA
Insulant:	Oil
Voltage:	22 kV

Prior to any operation

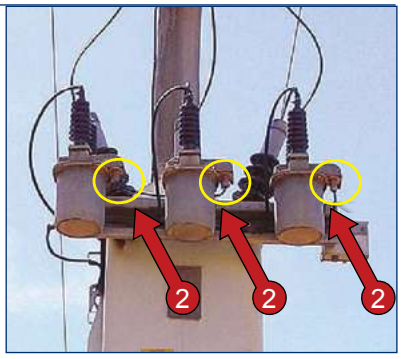
- These line capacitors are star connected, neutral point to ground, therefore before any switching the following protection must be suppressed:
  - Earth leakage protection on any upstream ACR
  - Feeder earth leakage and back up earth leakage (BUEL} at the feeder zone substation.
- The EDO fuses must not be used to make or break the capacitor current.
- Allow a minimum of five (5) minutes for the capacitor to discharge prior to earthing.

Closing the Capacitor HV Switches

1 Place the operating stick pin into the yellow operating lever eye hole.

2 Gently push up the yellow operating lever to the stop position to **CLOSE** the capacitor HV oil switch.

3 Repeat this procedure for all three (3) phases of the capacitor.

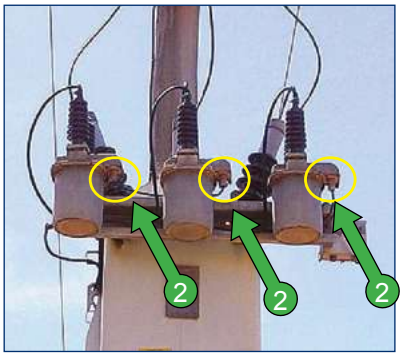


Opening the Capacitor HV Switches

1 Place the operating stick pin into the yellow operating lever eye hole.

2 Gently pull down the yellow operating lever to the stop position to **OPEN** the capacitor HV oil switch.

3 Repeat this procedure for all three (3) phases of the capacitor.



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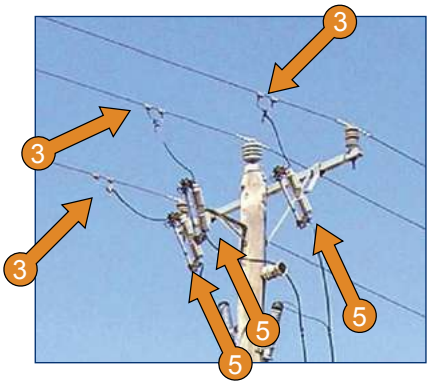
DUCON LINE CAPACITOR (CONTINUED)

Discharging / Earthing the Capacitor



1 Confirm the capacitor HV oil switches are open.

2 **OPEN** the capacitor EDO line fuses (3).

3 Lift and stow the capacitor line live line clamps if required.

4 Confirm a minimum of five (5) minutes has elapsed since the capacitor HV oil switches were opened.

5 Perform a 'Safe To Earth' test and if in order attach earth and shirt circuits to the earth flag bolts at the bottom of the EDO units.

6 **CLOSE** the capacitor HV oil switches. (3).

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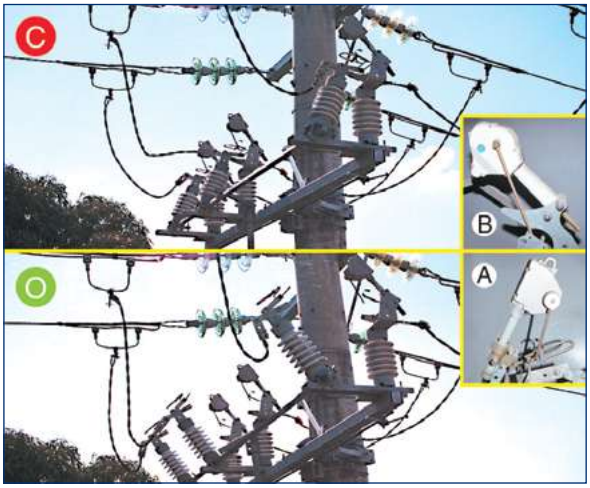
DUO GAP/EZY BREAK - 2 POST – LOAD INTERRUPTER

Functions: Opening, Closing
Rating: 400 amps
Insulant: Air
Voltage: 22kV, 11kV

Prior to any operation:

- Confirm HV switch is fit for service prior to operation.
- Operating handles may differ in construction however operating principles remain the same regardless of HV switch make or voltage.
- If HV switch is vertically mounted operating instructions may be reversed.
- Confirm switch location and labelling prior to operation.
- A = Duo Gap B = Ezybreak

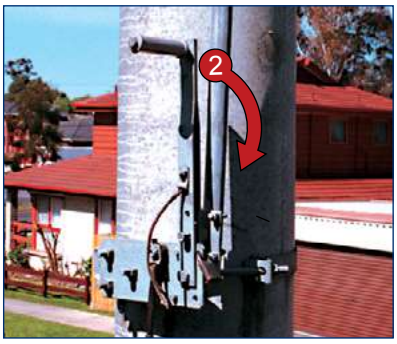


Closing HV Switch

1 Remove operating handle padlock.

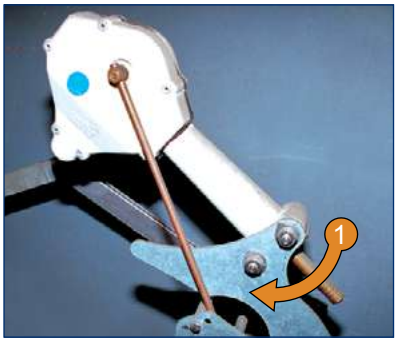
2 Lower operating handle firmly to stop position to **CLOSE** HV switch.

3 Confirm HV switch is closed and latched correctly.



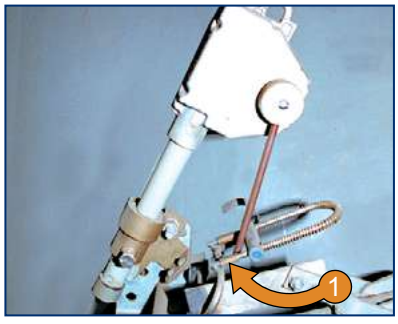
Ezy Break Latching (B)

1 Prior to opening HV switch, confirm Ezy Break latching rod is located correctly in the HV switch latching mechanism as shown.



Duo Gap Latching (A)

1 Prior to opening HV switch confirm Duo Gap latching rod is located correctly in the HV switch latching mechanism as shown.



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DUO GAP/EZY BREAK - 2 POST – LOAD INTERRUPTER (CONTINUED)

Opening HV Switch

1 Remove operating handle padlock.

2 Raise operating handle firmly to stop position to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.

2 of 2

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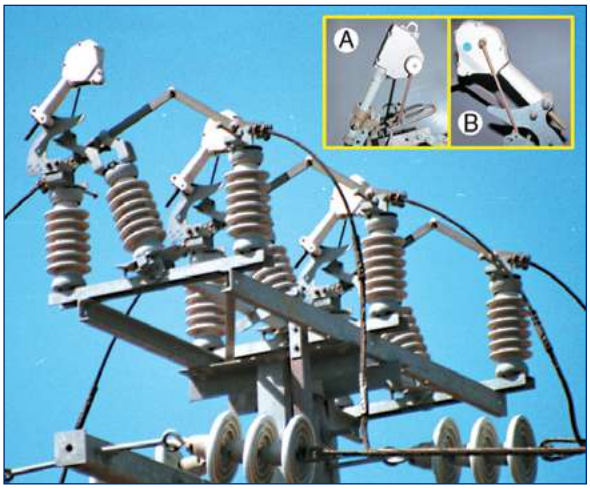
DUO GAP/EZY BREAK - 3 POST – LOAD INTERRUPTER

Functions: Opening, Closing
Rating: 400 amps
Insulant: Air
Voltage: 22kV, 11kV

Prior to any operation:

- Confirm HV switch is fit for service prior to and after operation.
- Operating handles may differ in construction however operating principles remain the same regardless of HV switch make or voltage.
- If HV switch is vertically mounted operating instructions may be reversed.
- Confirm switch location and labelling prior to operation.
- A = Duo Gap B = Ezybreak



Closing HV Switch

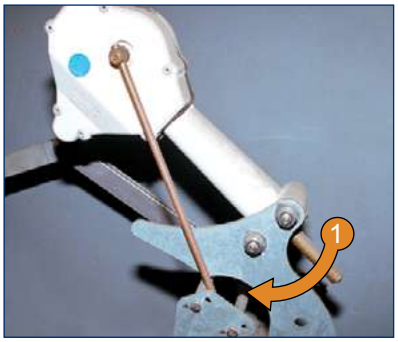
1 Remove operating handle padlock.

2 Raise operating handle firmly to stop position to **CLOSE** HV switch.

3 Confirm HV switch is closed and latched correctly.

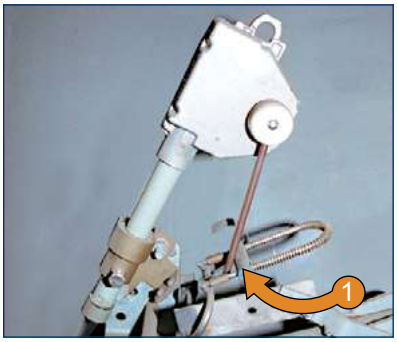
Ezy Break Latching (B)

1 Prior to opening HV switch confirm Ezy Break latching rod is located correctly in the HV switch latching mechanism as shown.



Duo Gap Latching (A)

1 Prior to opening HV switch confirm Duo Gap latching rod is located correctly in the HV switch latching mechanism as shown.



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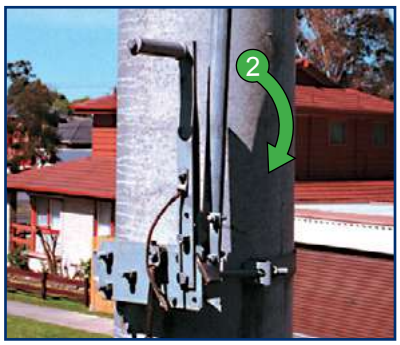
DUO GAP/EZY BREAK - 3 POST – LOAD INTERRUPTER (CONTINUED)

Opening HV Switch

1 Remove operating handle padlock.

2 Lower operating handle firmly to stop position to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.



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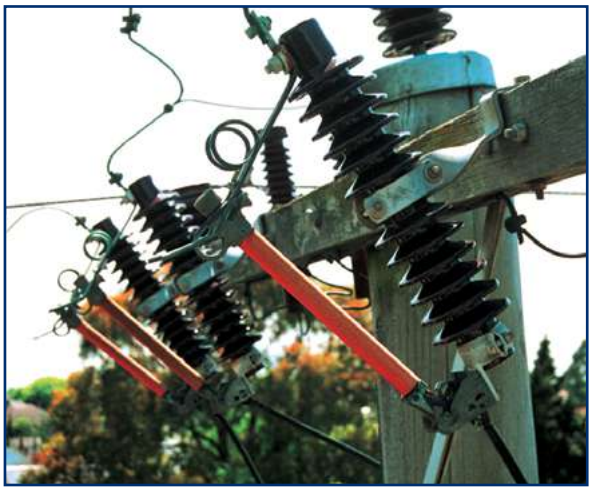
EDO HV FUSES

Prior to any operation:

- After removing HV fuses care should be taken prior to handling as fuses may be hot.
- Ensure HV stick movement maintains pressure on HV Fuse lower hinged fitting during closing and opening.
- Warning: HV fuse may be hot.
- EDO Fuses should not be left hanging in the open position if moisture could enter the exhaust end of the fuse thus affecting the fuse performance.

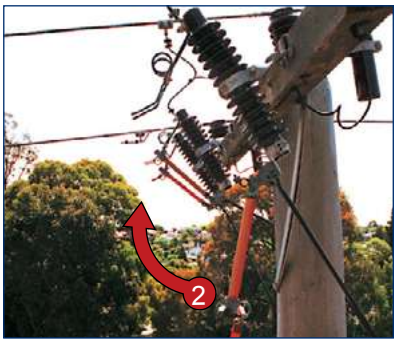
Functions:	Opening, Closing, HV Fuses
Rating:	Various
Insulant:	Air
Voltage:	22kV, 11kV, 6.6kV



Closing HV Fuse

1 Place HV operating stick pin in HV Fuse operating eye hole.

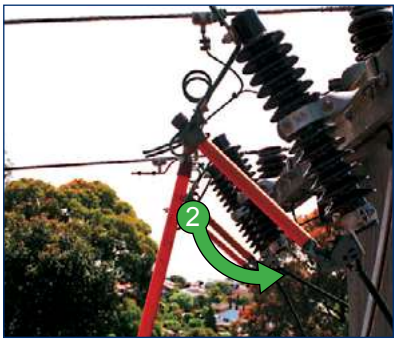
2 Raise HV fuse and push firmly **CLOSED**.



Opening HV Fuse

1 Place HV operating stick pin in HV Fuse operating eye hole.

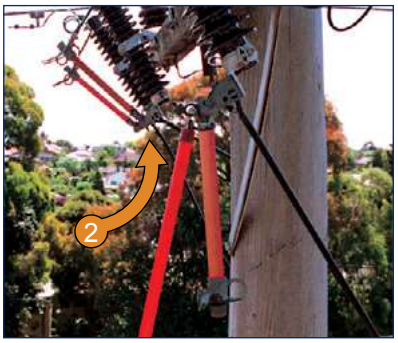
2 'Crack / inch' **OPEN** HV fuse and if in order fully lower HV fuse.



Removing HV Fuse

1 With HV Fuse in the open position place HV operating stick pin in HV fuse hinge operating eye hole.

2 Lift HV fuse out of hinge mechanism and remove.



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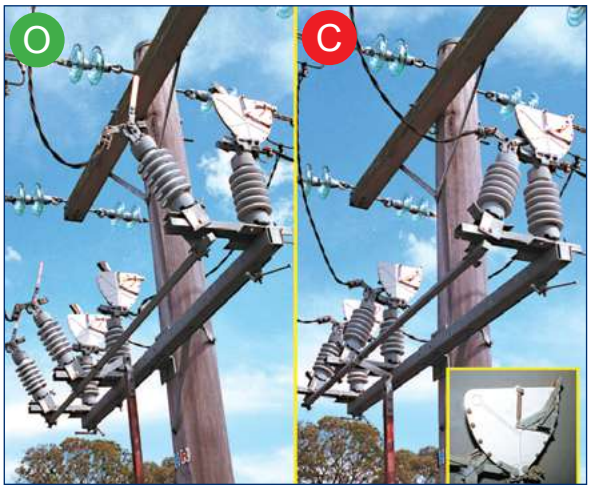
GAC (GANG ARC CHUTE) - 2 POST

Prior to any operation

- Confirm HV switch is fit for service prior to and after operation.
- Operating handles may differ in construction however operating principles remain the same regardless of HV switch make or voltage.
- If GAC is mounted vertically operating instructions may be reversed.
- Confirm switch location and labelling prior to operation.

Functions: Opening, Closing
Rating: 400 amps
Insulant: Air
Voltage: 22kV, 11kV, 6.6kV



Closing HV Switch

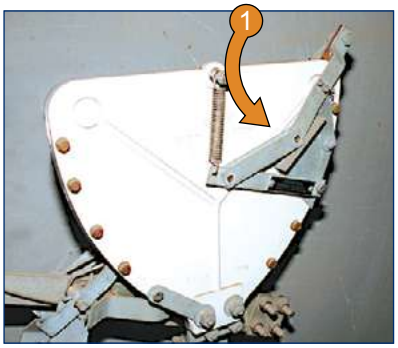
1 Remove operating handle padlock.

2 Lower operating handle firmly to stop position to **CLOSE** HV switch.

3 Confirm HV switch is closed and latched correctly.

Arc Chute Latching

1 Prior to opening HV switch confirm arc chute latching elbow is over-centre as shown.

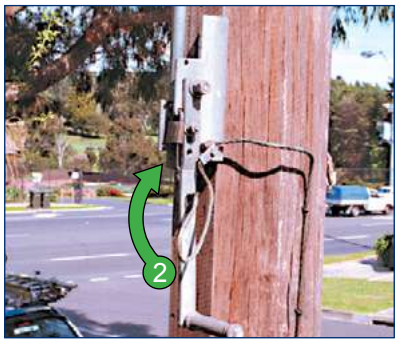


Opening HV Switch

1 Remove operating handle padlock.

2 Raise operating handle firmly to stop position to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.



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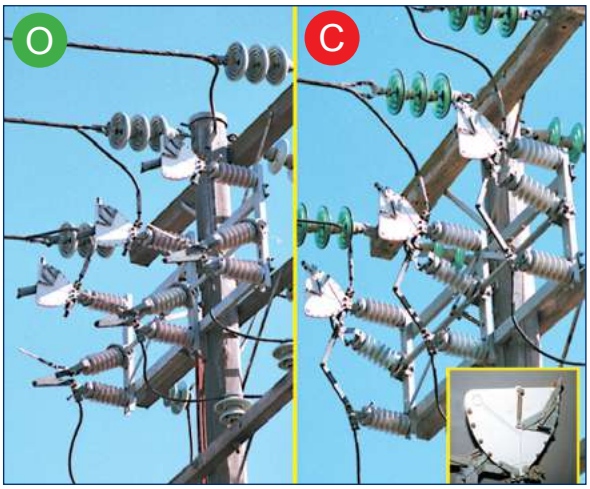
GAC (GANG ARC CHUTE) - 3 POST

Prior to any operation

- Confirm HV switch is fit for service prior to and after operation.
- Operating handles may differ in construction however operating principles remain the same regardless of HV switch make or voltage.
- If GAC is mounted horizontally operating instructions may be reversed.
- Confirm switch location and labelling prior to operation.

Functions: Opening, Closing
Rating: 400 amps
Insulant: Air
Voltage: 22kV, 11kV



Closing HV Switch

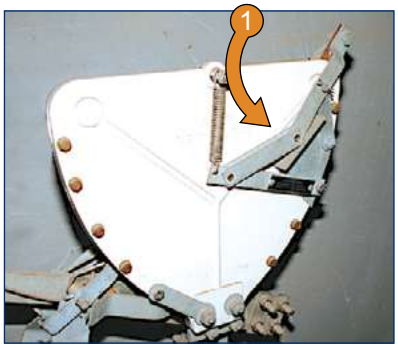
1 Remove operating handle padlock.

2 Lower operating handle firmly to stop position to **CLOSE** HV switch.

3 Confirm HV switch is closed and latched correctly.

Arc Chute Latching

1 Prior to opening HV switch confirm arc chute latching elbow is over-centre as shown.

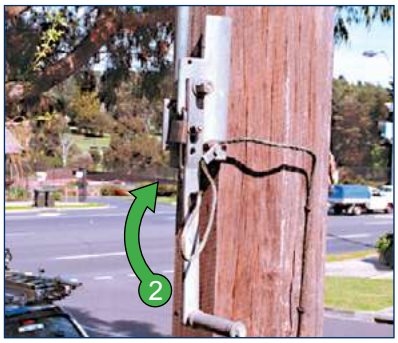


Opening HV Switch

1 Remove operating handle padlock.

2 Raise operating handle firmly to stop position to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.



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GANG ISOLATORS

Prior to any operation

- Confirm HV Gang Isolators are fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	400 amps
Break Rating:	Energise/de-energise unloaded trans/line only
Insulant:	Air
Voltage:	1kV, 6.6kV

Closing HV Isolators

1 Push / Pull HV Isolators operating handle in direction of arrow shown until locating pin enters hole (2).

Opening HV Isolators

1 Push / Pull HV Isolators operating handle in direction of arrow shown until locating pin enters hole (2).

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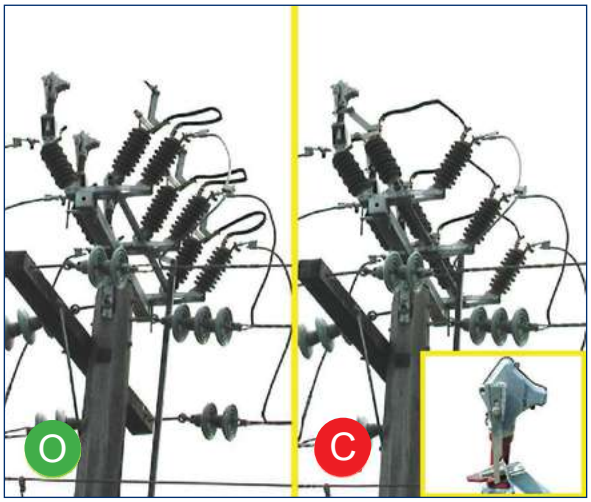
GEVEA HOLEC GANG AIR BREAK SWITCH

Prior to any operation

- Confirm the HV switch is fit for service prior to and after any operation.
- Confirm the HV switch location and labelling prior to operation.
- The locking pin should automatically engage when the HV switch is closed correctly.

Functions: Opening, Closing
Rating: 400 amps
Insulant: Air
Voltage: 22kV, 11kV



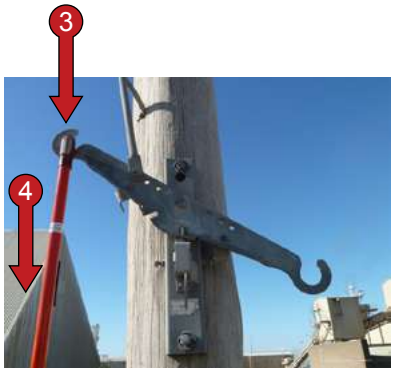
Closing HV Switches

1 Place the HV operating stick pin into the operating mechanism locking pin eye hole as shown.

2 Pull down the locking pin and rotate to the left to the stop position.

3 Place the HV operating stick pin in the ‘C’ hook on the raised side of the operating mechanism crank.

4 Pull down the operating mechanism crank firmly to the stop position to **CLOSE** the HV switch.



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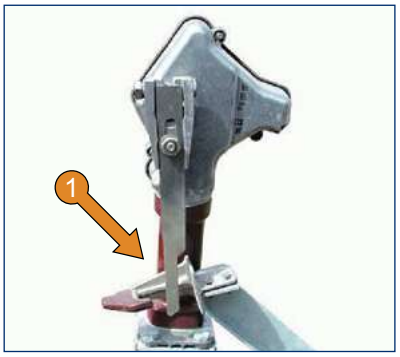
GEVEA HOLEC GANG AIR BREAK SWITCH (CONTINUED)

Arc Expulsion Device Latching

1 Prior to opening the HV switch confirm the arc expulsion device latching rod is located correctly in the HV switch latching mechanism as shown.



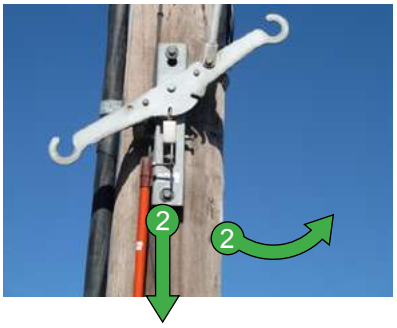
Opening the HV Switch

1 Place the HV operating stick pin into the operating mechanism locking pin eye hole as shown.

2 Pull down the locking pin and rotate to the right to the stop position.

3 Place the HV operating stick pin in the ‘C’ hook on the raised side of the operating mechanism crank.

4 Pull down the operating mechanism crank firmly to the stop position to OPEN the HV switch.



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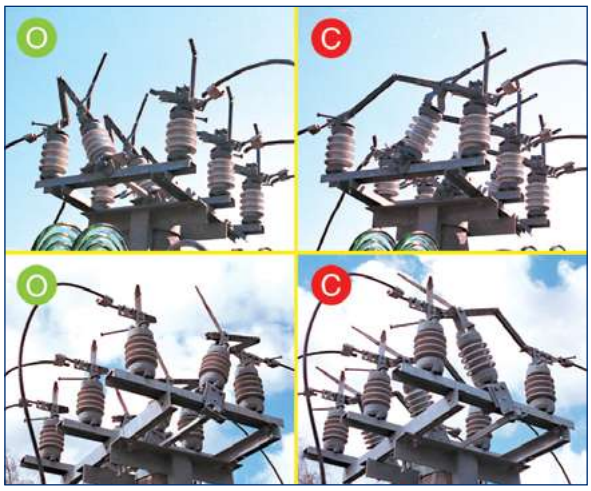
GFB (GANG FLICKER BLADE)

Prior to any operation

- Confirm HV switch is fit for service prior to and after operation.
- Operating handles may differ in construction however operating principles remain the same regardless of GFB make or voltage.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	400 amps
Break Rating:	20 amps
Insulant:	Air
Voltage:	22kV, 11kV, 6.6kV

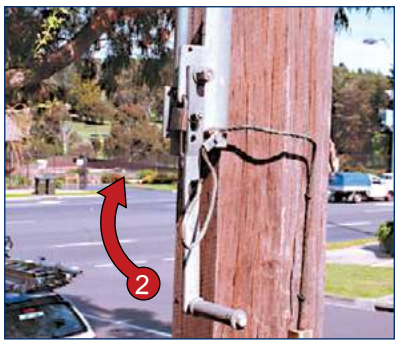


Closing HV Switch

1 Remove operating handle padlock.

2 Raise operating handle firmly to stop position to **CLOSE** HV switch.

3 Confirm HV switch is closed and latched correctly.



Opening HV Switch

1 Remove operating handle padlock.

2 Lower operating handle firmly to stop position to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.

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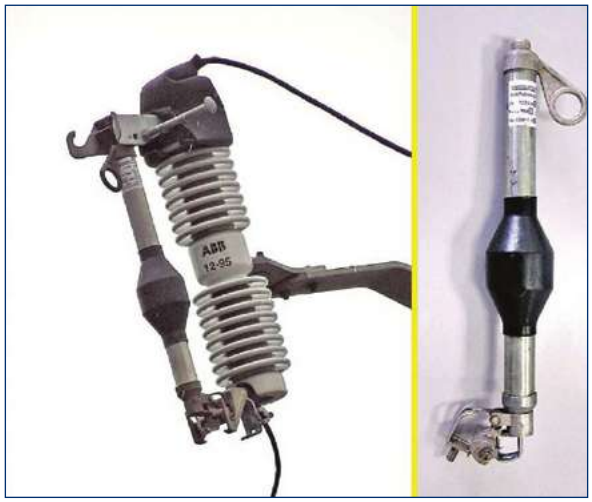
HAYCOLEC SECTIONALISER TYPE 01-04

Prior to any operation

- For instructions on opening, closing and removal of the sectionaliser refer to the EDO HV FUSE section in this manual.
- Note: Confirm the Sectionaliser is safe to handle after removal - it may be hot.

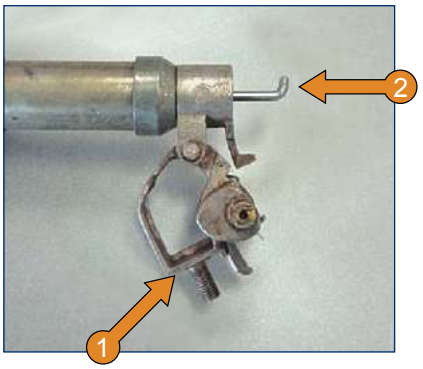
Functions: Opening, Closing
Rating: 8 – 24, 40 -112
Insulant: Air
Voltage: 2.7 kV



Resetting the Sectionaliser Operating Trundle

1 Move the operating trundle to its latching position as shown.

2 Rotate the latching pin so it is pointing away from the trundle as shown.

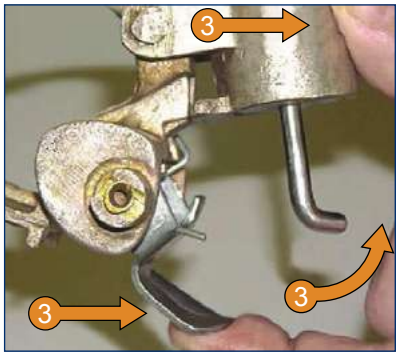


3 Using the thumb and finger as shown carefully move the spring loaded flap towards the latching pin.

Note: *Ensure the latching pin is in the correct position before moving the spring loaded flap.*

4 Rotate the latching pin to the latch position as shown then carefully release the spring loaded flap. The sectionaliser is now ready for service.

Note: *Avoid injury to fingers. Release the spring loaded flap carefully.*



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HAYCOLEC SECTIONALISER TYPE 01-04 (CONTINUED)

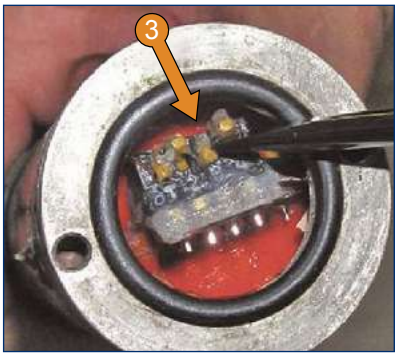
Setting the Sectionaliser DIP Switches

1 Remove the top cap of the sectionaliser by unscrewing the two (2) retaining allen key bolts as shown. Stow allen keys safety.

2 Determine the required DIP Switch settings from the table below.

3 Using a small bladed screw driver set the DIP switches to the required setting.

4 Replace the top cap ensuring the allen key screws are tightened firmly to seal against water ingress.



Position ofthe DIP Switch				Sectionaliser Field			
				Sectionaliser Type SECT 01		Sectlonallser Type SECT 04	
1	2	3	4	Pick-Up (A)	No. of Count	Pick-Up (A)	No. of Count
ON	OFF	ON	OFF	8		40	1
ON	OFF	OFF	ON	8	2	40	2
ON	OFF	ON	ON	8	3	40	3
OFF	ON	ON	OFF	16		56	1
OFF	ON	OFF	ON	16	2	56	2
OFF	ON	ON	ON	16	3	56	3
OFF	OFF	ON	OFF	20		80	1
OFF	OFF	OFF	ON	20	2	80	2
OFF	OFF	ON	ON	20	3	80	3
ON	ON	ON	OFF	24		112	1
ON	ON	OFF	ON	24	2	112	2
ON	ON	ON	ON	24	3	112	3

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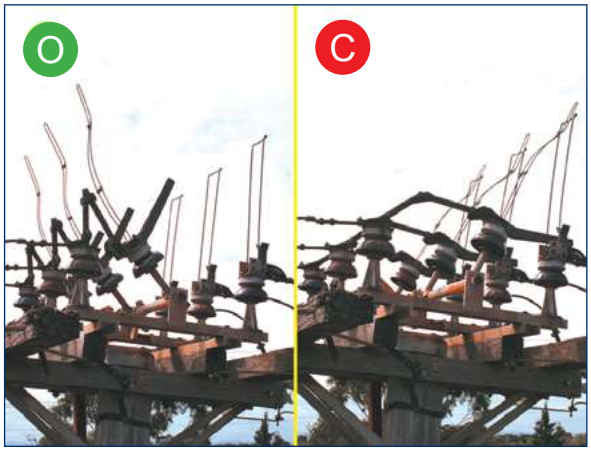
HD (HORN DEFLECTOR) SWITCH

Prior to any operation

- Confirm HV switch is fit for service prior to and after operation.
- If HD switch is vertically mounted operating instructions may be reversed.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	200 amps
Break Rating:	Energise/de-energise unloaded trans/line only
Insulant:	Air
Voltage:	22kV, 11kV, 6.6kV

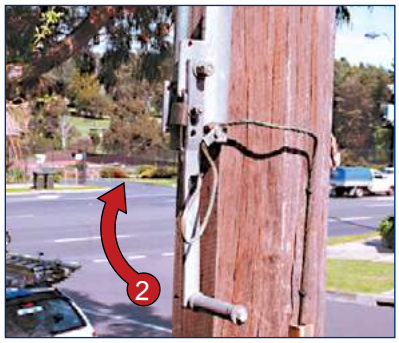


Closing HV Switch

1 Remove operating handle padlock.

2 Raise operating handle firmly to stop position to **CLOSE** HV switch.

3 Confirm HV switch is closed and latched correctly.

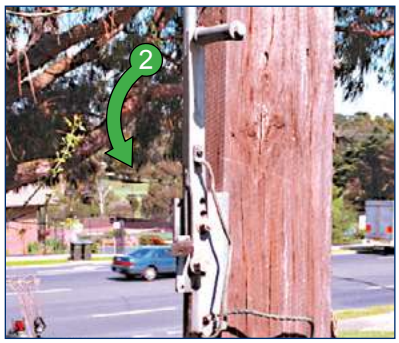


Opening HV Switch

1 Remove operating handle padlock.

2 Lower operating handle firmly to stop position to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.



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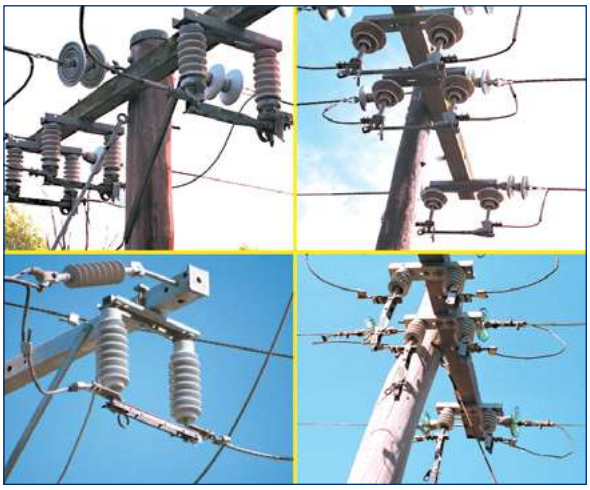
HV ISOLATORS

Prior to any operation

- Confirm HV Isolators are fit for service prior to and after operation.
- HV Isolators are NOT to be used to break load.
- The HV Isolators pictured are a sample of types used. In most cases the operating principles, as described below, are the same regardless of the make or operating voltage.
- Confirm Isolator location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	Various
Insulant:	Air
Voltage:	66kV, 22kV, 11kV, 6.6kV

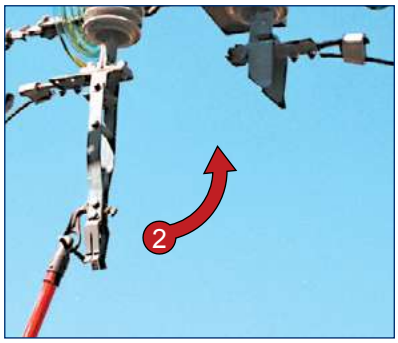


Closing HV Isolator

1 Place HV operating stick pin in Isolator operating eye hole.

2 Push firmly to **CLOSE** HV Isolator.

3 If applicable check HV Isolator latching mechanism has functioned correctly.



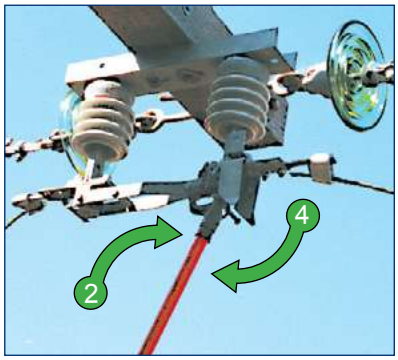
Opening HV Isolator

1 Place HV operating stick pin in Isolator operating eye hole.

2 Push HV Isolator upwards to remove pressure on latching mechanism.

3 'Crack / inch' HV Isolator **OPEN** and if in order:

4 Pull HV Isolator fully **OPEN**.



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ILJIN GAS SWITCH

Prior to any operation:

- Confirm the HV switch is fit for service prior to and after operation.
- Confirm correct HV switch gas pressure via the gas pressure gauge prior to operating. If the gauge indicates low gas pressure DO NOT operate the HV switch.
- Confirm the HV switch location and labelling prior to operation.

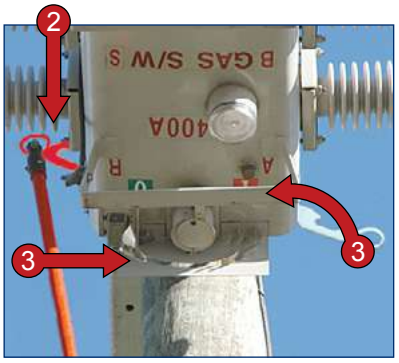
Functions:	Opening, Closing
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV, 11kV

Closing the HV Switch

1 Place HV operating stick on the red end of HV switch operating mechanism lever as shown.

2 Pull down operating mechanism lever to stop position to **CLOSE** the HV switch.

3 Confirm semaphore arrow agrees with the HV switch status.

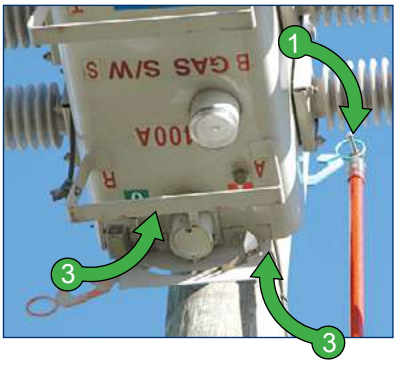


Opening the HV Switch

1 Place HV operating stick on the green end of HV switch operating mechanism lever as shown.

2 Pull down operating mechanism lever to stop position to **OPEN** the HV switch.

3 Confirm semaphore arrow agrees with the HV switch status.



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IT-GANG OPERATED EDO FUSES

Prior to any operation:

- Confirm the gang operated EDO fuses are fit for service prior to and after any operation.
- Do not leave the EDO HV fuses in the open position for extended periods.
- Confirm the gang operated EDO fuses location and labelling prior to operating.

Functions: Opening, Clsoing
Rating: Various
Insulant: Air
Voltage: 6.6kV

Closing/Opening the EDO Fuses

1 To close the HV EDO fuses, pull down the operating eyebolt to reset the mechanical tripping device then close each EDO in tum.

2 To open the HV EDO fuse, push up the operating eye bolt to release the mechanical tripping device.

IT-GANG OPERATED EDO FUSES

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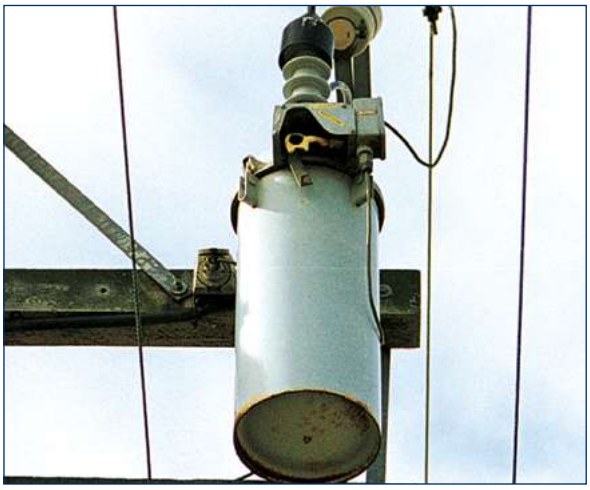
KYLE E ACR - SINGLE PHASE

Prior to any operation

- If power supply to ACR is via SWER transformer carry out Safe to Approach test prior to operation.
- Confirm ACR location and labelling prior to operation.
- Auto reclose must be suppressed if closing after lockout operation.

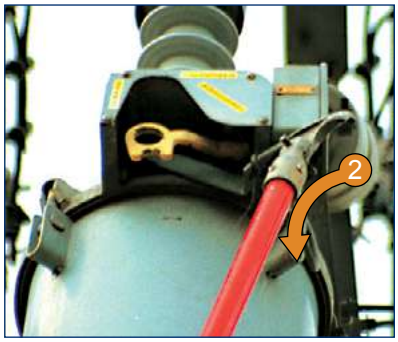
Functions:	Opening, Closing, Isolation, Auto Reclose, O/C Prot.
Rating:	Various
Insulant:	Oil
Voltage:	22kV, 11kV



Suppression of ACR Auto Reclose

1 Place operating stick pin onto inner grey operating lever.

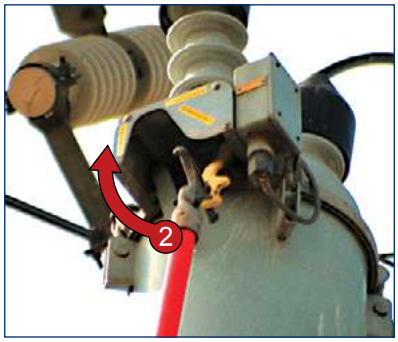
2 Pull down grey operating lever to stop position to suppress ACR auto reclose.



Closing ACR – Manual

1 Place operating stick pin into outer yellow operating lever eye hole.

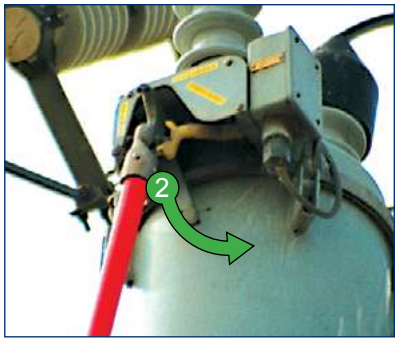
2 Push up operating lever to stop position and hold for app. ten (10) seconds to **CLOSE** ACR.



Opening ACR - Manually

1 Place operating stick pin into outer yellow operating lever eye hole.

2 Pull down yellow operating lever to stop position to **OPEN** ACR.



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LEXINGTON SWER ACR

Prior to any operation:

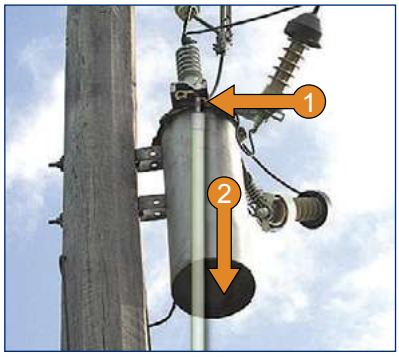
- Confirm the ACR and associated apparatus are fit for service prior to and after any operation.
- Ensure the bypass HV EDO fuse is closed prior to opening the ACR.
- Ensure the correct identification of the operating lever prior to insertion of the operating stick.
- Do not leave the bypass HV EDO fuse in the open position. Remove and stow out of the weather until required for bypassing the ACR
- Confirm the ACR location and labelling prior to operation.
- Some ACRs are constructed with only one HV isolator on the line side and a live line clamp on the load side. In this case the live line clamp is lifted and stowed as the second isolation.

Functions:	Opening, Closing, Isolation, Auto Reclose, HV Fuses
Rating:	Various
Insulant:	Oil
Voltage:	2.7kV

Suppressing the ACR Auto Reclose

1 Place the operating stick pin into the inner orange / grey reclose suppression operating lever.

2 Pull down the orange / grey operating lever to suppress the ACR auto reclose.



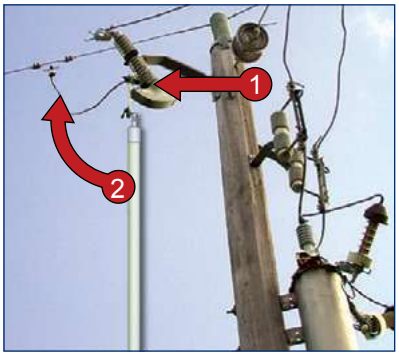
Bypassing the ACR

1 Place the HV EDO fuse into the hinge mechanism.

2 Place the operating stick pin into the bypass HV fuse operating eye hole as shown.

3 CLOSE the HV fuse as per the EDO HV FUSES template in this manual.

4 Confirm the HV fuse has latched correctly.



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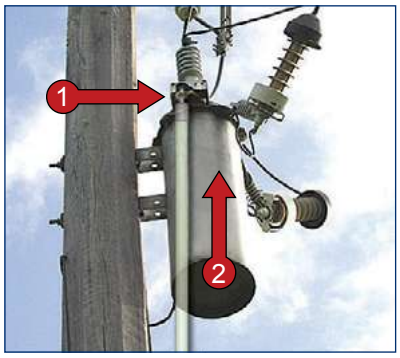
LEXINGTON SWER ACR (CONTINUED)

Closing the ACR – Manually

Note: *The ACR auto reclose must be suppressed if closing after a lockout operation.*

1 Place the operating stick pin into the outer yellow open / close operating lever.

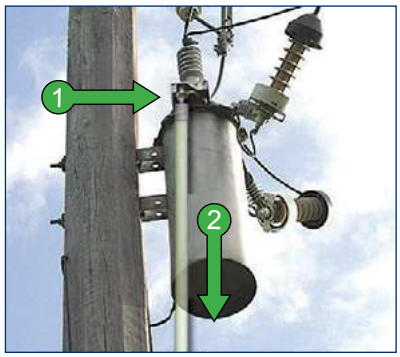
2 Push up the yellow operating lever and hold for approximately ten (10) seconds to CLOSE the ACR.



Opening the ACR – Manually

1 Place the operating stick pin into the outer yellow open / close operating lever.

2 Pull down the yellow operating lever and hold for approximately ten (10) seconds to OPEN the ACR.

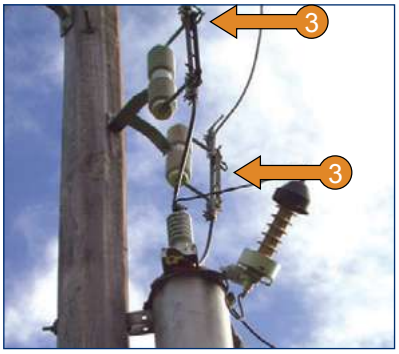


Isolating the ACR

1 Confirm the bypass HV EDO fuse is closed.

2 Confirm the ACR is open - (yellow operating lever is down).

3 Open the two (2) ACR HV isolators to isolate the ACR.



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LM RV ACR

Functions:	Opening - HV Op Stick / Local Electrical, Closing - HV Op Stick / Local Electrical, E/F Protection, Auto Reclose
Rating:	Various
Insulant:	Oil
Voltage:	22kV

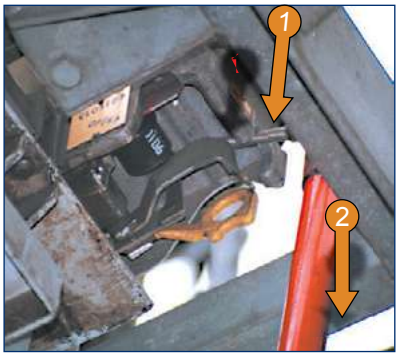
Prior to any operation:

- Confirm the ACR is fit for service prior to and after any operation.
- The RV ACR is operated manually except for those units constructed with the ex 'SECV' type control box. Instructions for both are shown below.
- Confirm the ACR location and labelling prior to operation.
- Check / confirm oil levels gas pressure labelling semaphores
- The auto reclose must be suppressed if closing after lockout operation.

Suppressing the ACR Auto Reclose

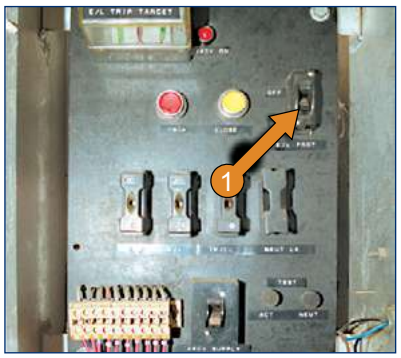
1 Place the HV switch stick operating pin onto the INNER grey operating lever as shown.

2 Pull down the grey operating lever to the stop position to suppress the ACR auto reclose.



Suppressing the ACR Earth Leakage Prot.

1 Raise the earth leakage protection 'ON/OFF' switch to the 'OFF' position to suppress the ACR earth leakage protection.



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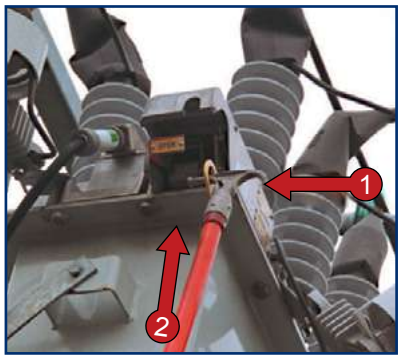
LM RV ACR (CONTINUED)

Closing the ACR – Manually

1 Insert the HV switch stick operating pin into the yellow operating lever eye hole as shown.

2 Push up the yellow operating lever to the stop position to CLOSE the ACR.

3 Confirm the semaphore agrees with the ACR status.

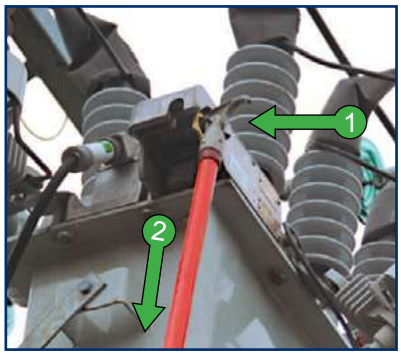


Opening the ACR - Manually

1 Insert the HV switch stick operating pin into the yellow operating lever eye hole as shown.

2 Pull down the yellow operating lever to the stop position to OPEN the ACR.

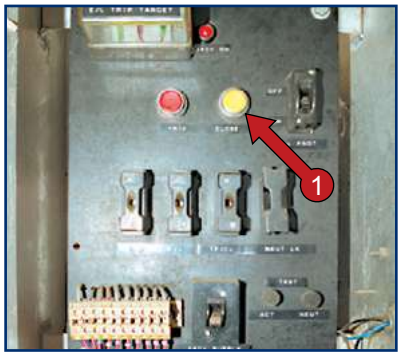
3 Confirm the semaphore agrees with the ACR status.



Closing the ACR - Electrically (Ex SECV C'Box)

1 Press the yellow 'CLOSE' button to CLOSE ACR.

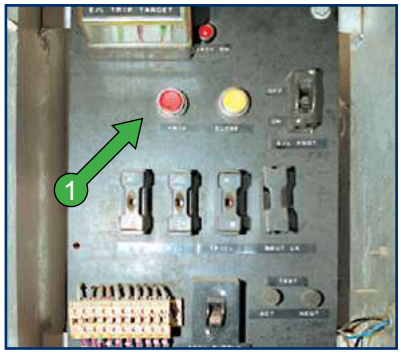
2 Confirm the indicating lights / semaphores agree with the ACR status.



Opening the ACR - Electrically (Ex SECV C'Box)

1 Press the red 'TRIP' button to OPEN the ACR.

2 Confirm the indicating lights / semaphores agree with the ACR status.



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LOADBUSTER

Functions:	Opening fuses only
Rating:	600 amps interrupting current
Insulant:	N/A
Voltage:	up to 27kV

Prior to any operation:

- Prior to any switching confirm Loadbuster is in test date and fit for service and Loadbuster is fully closed. (Refer picture on right)
- Use full length operating stick with rising sun attachment.
- Used to open EDO, Boric Acid, PF and Fault Tamer fuses.
- **Do not use Loadbuster to close fuses.**

Opening Fuses

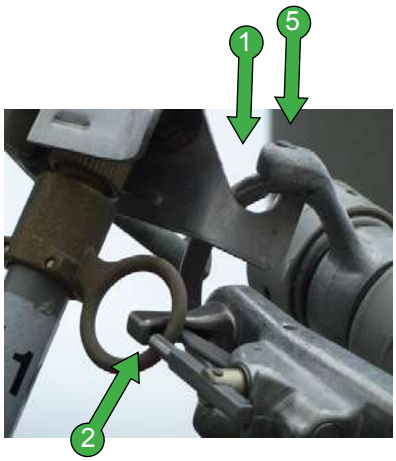
1 Place the Loadbuster over the arching horn at the top of the unit.

2 Clip the operating mechanism into the eye of the fuse ensuring that it is fully clipped in.

3 Pull down in a firm but steady action to its maxium extended length and the Loadbuster will click into the open position.

4 Gently twist Loadbuster unit anticlockwise until Loadbuster clip releases and the fuse falls to the fully open position. Ensure that the load buster unit IS NOT PUSHED UP when twisting and releasing the clip or the circuit will re energise via the fuse.

5 Remove Loadbuster from top arching horn of unit.



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LOADBUSTER (CONTINUED)

Resetting the Loadbuster

1 Gently pull back the retaining clip.

2 Push the inner tube fully down into the outer tube until you hear a click.

3 Unit fully closed and ready for operation.

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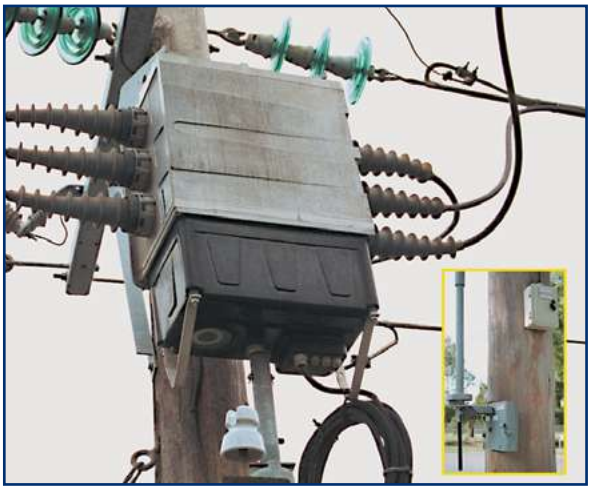
MERLIN GERIN PM6

Prior to any operation:

- If required HV switch gas pressure can be checked at test point adjacent to operating handle. See insert in main picture.
- Confirm switch location and labelling prior to operation.

Functions: Opening, Closing
Rating: 400 amps
Insulant: SF6
Voltage: 22kV



Access to Operating Handle

1 Unlock and remove padlock.

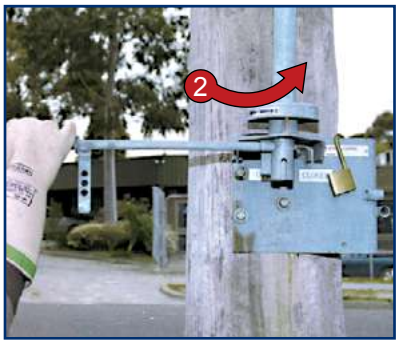
2 Pull down operating handle downwards to release.

Closing HV Switch

1 Insert operating handle into operating mechanism.

2 Rotate operating handle ACW horizontally to stop position to **CLOSE** HV switch.

3 Confirm semaphore agrees with switch status.



Opening HV Switch

1 Insert operating handle into operating mechanism.

2 Rotate operating handle CW horizontally to stop position to **OPEN** HV switch.

3 Confirm semaphore agrees with switch status.

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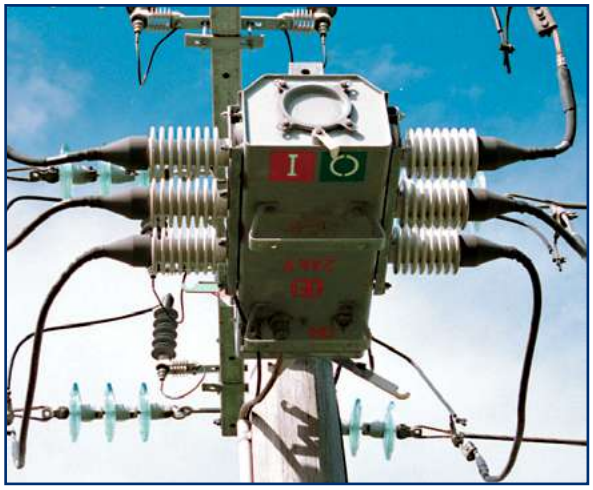
NGK GAS SWITCH (AUTOMATABLE)

Prior to any operation:

- If low pressure gas indicator window is showing red indication **do not operate** HV switch.
- For Electrical operation refer to the installed Control Box in this manual.
- Electrical operation is always the preferred method of operation.
- Confirm switch location and labelling prior to operation.
- Spring must be charged at all times (white lever down).

Functions:	Opening, Closing
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV, 11kV



Closing HV Switch - Manual

1 Place HV operating stick on red HV switch operating mechanism lever.

2 Pull down operating mechanism lever to stop position to **CLOSE** HV switch.

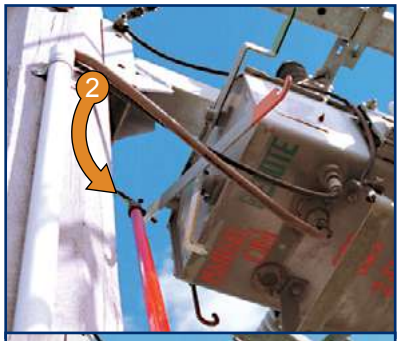
3 Confirm semaphore agrees with switch status.

Charging HV Switch Operating Mechanism

1 Place HV operating stick on white HV switch operating mechanism lever.

2 Pull down operating mechanism lever to stop position to charge operating mechanism.

3 Confirm semaphore indicates ‘Remote’.



Opening HV Switch - Manual

1 Place HV operating stick on green HV switch operating mechanism lever.

2 Pull down operating mechanism lever to stop position to **OPEN** HV switch.

3 Confirm semaphore agrees with switch status.

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NGK GAS SWITCH (MANUAL)

Prior to any operation:

- If low pressure gas indicator window is showing red indication, do NOT operate HV switch.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	400 amps
Insulant:	SF6
Voltage:	22kV, 11kV

Gas Switch Open

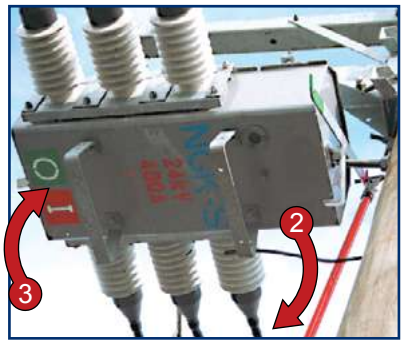
Gas Switch Closed

Closing HV Switch

1 Place HV operating stick on red end of HV switch operating mechanism lever.

2 Pull down operating mechanism lever to stop position to **CLOSE** HV switch.

3 Confirm semaphore agrees with switch status.

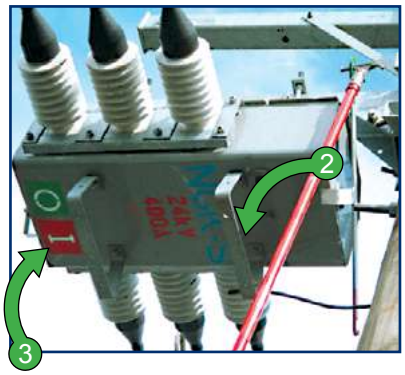


Opening HV Switch

1 Place HV operating stick on green end of HV switch operating mechanism lever.

2 Pull down operating mechanism lever to stop position to **OPEN** HV switch.

3 Confirm semaphore agrees with switch status.



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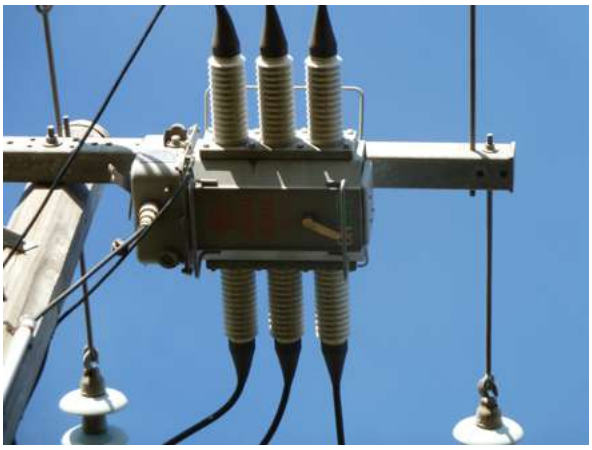
NGK MK1 GAS SWITCH

Prior to any operation

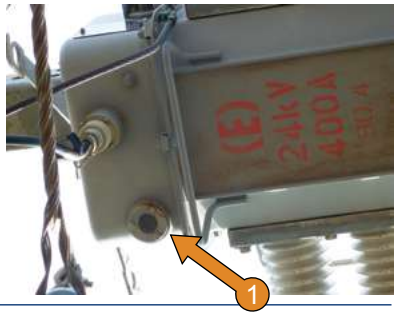
- Confirm the gas switch is fit for service prior to and after any operation.
- Do not attempt to operate the gas switch if the low gas pressure red indicator is visible.
- Local electrical operation of this gas switch is always the preferred method.
- Confirm/check gas pressure and labelling.
- Confirm the gas switch location and labelling prior to any operation.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	400 Amps
Insulant:	SF6
Voltage:	22 kV



Confirming Correct SF6 Gas Pressure

1 Prior to any operation confirm the gas switch low gas pressure semaphore does not display a red indicator.



Closing the Gas Switch – Local Electrically

1 Confirm the manual operating lever on the gas switch is pointing to ‘REMOTE’.

2 Confirm the gas switch semaphore points to OFF.

3 Unlock the security padlock and unscrew the eight (8) retaining and remove the local electrical control access cover.

4 Confirm the ‘POWER’ switch is ‘ON’.

5 Withdraw the ‘CONTROL SWITCH’ locking pin.

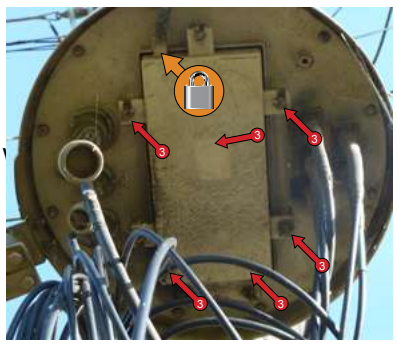
6 Rotate the ‘CONTROL SWITCH’ CW to the ‘ON’ position to close the gas switch.

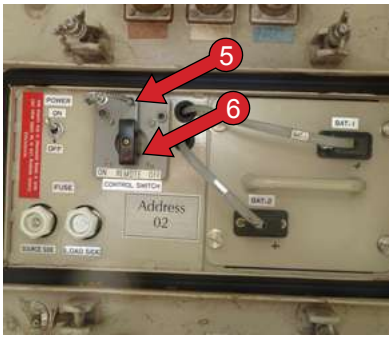
7 Confirm the gas switch semaphore shows OFF (ON)

8 Rotate the ‘CONTROL SWITCH’ ACW to the ‘REMOTE’ position as shown.

9 Insert the ‘CONTROL SWITCH’ locking pin.

10 Replace the access cover and tighten the eight (8) wing nuts. Lock the security padlock.





Note: *Confirm the gas switch has closed via the mechanical indicator.*

Ensure *the electrical control access cover is replaced with the wing nuts tightened and the security padlock in place at the completion of any operation.*

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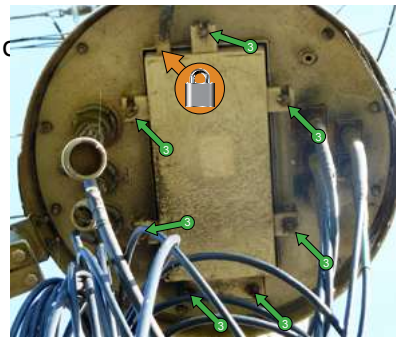
NGK MK1 GAS SWITCH (CONTINUED)

Opening the Gas Switch – Local Electrically



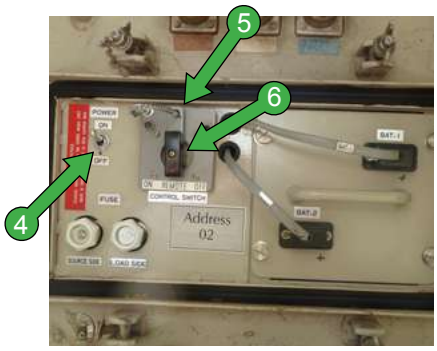
1 Note: The manual operating lever on the gas switch can be pointing to the 'MANUAL ON' or "REMOTE' position depending on the gas switch was previously closed manually or electrically.

2 Confirm the gas switch semaphore points to on.

3 Unlock the security padlock and unscrew the eight (8) retaining wing nuts and remove the local electrical control access cover.

4 Confirm the 'POWER' switch is 'ON'.

5 Withdraw the 'CONTROL SWITCH' locking pin.



6 Rotate the 'CONTROL SWITCH' ACW to the 'OFF' position to open the gas switch.

7 Confirm the gas switch semaphore shows (OFF)

8 Rotate the 'CONTROL SWITCH' CW to the 'REMOTE' position as shown.

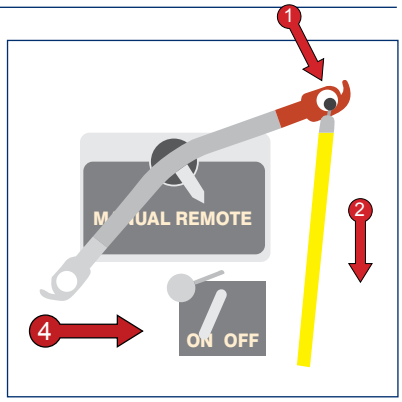
9 Insert the 'CONTROL SWITCH' locking pin.

10 Replace the access cover and tighten the eight (8) wing nuts. Lock the security padlock.

Note: *Confirm the gas switch has opened via the mechanical indicator.*

Ensure *the electrical control access cover is replaced with the wing nuts tightened and the security padlock in place at the completion of any operation.*

Closing the Gas Switch – Manually



1 Place the HV operating stick pin into the red (right side) of the gas switch manual operating lever as shown.

2 Pull down the operating lever to the stop position to close the gas switch. The indicator will point to 'MANUAL ON'.

3 Remove the HV operating stick.

4 Confirm the gas switch semaphore shows

(ON).

Note: *This method of closing the gas switch will override all local electrical control settings.*

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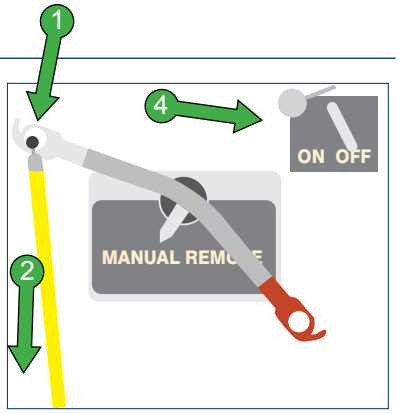
NGK MK1 GAS SWITCH (CONTINUED)

Opening the Gas Switch – Manually



1 Place the HV operating stick pin into the white (left side) of the gas switch manual operating lever as shown.

2 Pull down the operating lever to the stop position to open the gas switch. The indicator will point to 'REMOTE'.

3 Remove the HV operating stick.

4 Confirm the gas switch semaphore shows

(OFF).

5 Important- Refer to the special notes below.

Warning: *To avoid immediate reclosure of the gas switch ensure the 'CONTROL SWITCH' is not in the 'ON' position.*

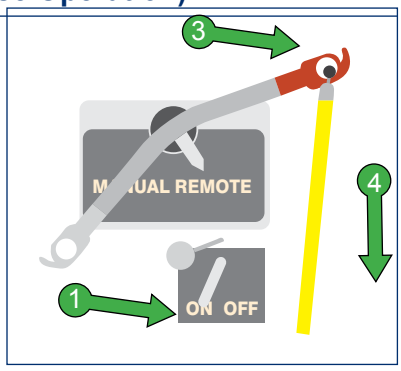
Opening the Gas Switch – Manually (Special Notes)

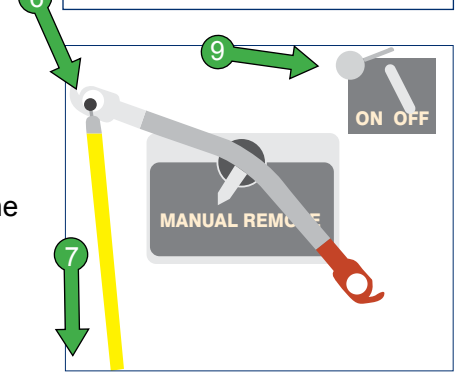
When manually opening the gas switch the following may occur.

- If the electrical control station is disconnected / removed - the gas switch will remain open.
- If the electrical control station is in service and the 'CONTROL SWITCH' is in the 'OFF' position - the gas switch will remain open.
- If the electrical control station is in service and the 'CONTROL SWITCH' is in the 'ON' position - the gas switch will open then immediately close.

Note: *If the gas switch is an isolation point for an Electrical Access Permit the relevant 'CONTROL SWITCH' must be placed in the 'OFF' position.*

Opening the Gas Switch – Manually (After an Electrical Close Operation)





1 Confirm the gas switch semephore point to ON.

2 Confirm the gas switch manual operating lever points to REMOTE.

3 Place the HV operating stick pin int the red (right side) of the gas switch manual operating lever.

4 Pull down the operating lever to the stop position.

Note the gas switch will remain closed.

5 Remove the HV operating stick.

6 Place the HV operating stick into the white (left side) of the gas switch manual operating lever as shown.

7 Pull down the operating lever to the sop position to open the gas switch. The indicator will point to REMOTE.

8 Remove the HV operating stick.

9 Confirm the gas switch semaphore shows

OFF.

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NOVA ACR

Prior to any operation:

- Confirm the ACR location and labelling prior to operation.
- Manual opening is only to be done if the ACR cannot be operated from the control box.
- Confirm the ACR is fit for service prior to and after any operation.
- Electrical operation of the Nova ACR is the preferred method of operation. Refer to the Kyle Form 5 Electronic Control Box template in this manual for electrical operation details.
- The Nova ACR cannot be closed manually. The yellow operating lever must be in the fully raised position to enable electrical closing of the ACR.

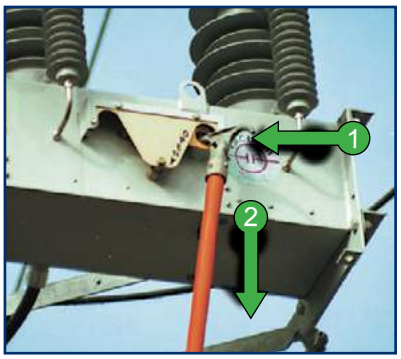
Functions:	Opening - HV Operating Stick, Auto Reclose
Rating:	Various
Insulant:	Vacuum
Voltage:	22kV

Opening the ACR - Local Manually

1 Insert the HV switch stick operating pin into the yellow operating lever eye hole as shown.

2 Pull down the yellow operating lever to the stop position to OPEN the ACR.

3 Confirm semaphores agree with the ACR status.



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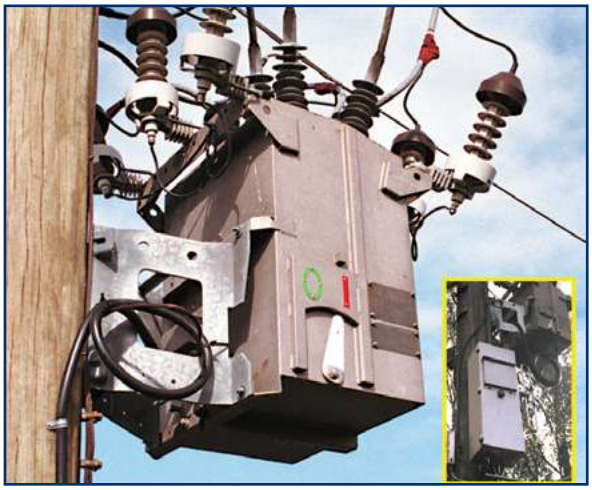
NULEC ACR

Prior to any operation:

- Electrical operation of the Nulec ACR is the preferred method of operation. Refer to the Nulec Electronic Control section of this manual for electrical operation details.
- The Nulec ACR has a manual lock out lever as shown in the 'Opening. ACR - Manually' instruction below.
- Confirm ACR location and labelling prior to operation.
- Manual opening only to be used if ACR cannot be operated from the control box.

Functions: Opening
Rating: Various
Insulant: Vacuum
Voltage: 22kV

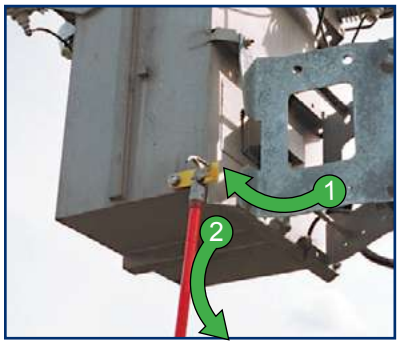


Opening ACR - Manually

1 Place the HV switch stick operating pin onto the yellow operating lever.

2 Pull down the yellow operating lever to stop position to **OPEN** the ACR.

3 Confirm semaphores agree with ACR status.



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NULEC L24 GAS SWITCH / SECTIONALISER

Prior to any operation

- Confirm the gas switch / sectionaliser is fit for service prior to and after operation.
- Electrical operation of this gas switch/ sectionaliser is always the preferred method. Refer to the appropriate Nulec Electronic Control Box template in the Miscellaneous section of this manual for electrical operation instructions.
- The gas switch/sectionaliser cannot be opened by any means - manually or electrically - when in the **M** (Manual) position.
- The gas switch can be opened manually and opened and closed electrically with the operating lever in the **A** (Auto) position.
- Confirm the gas switch / sectionaliser location and labelling prior to any operation.

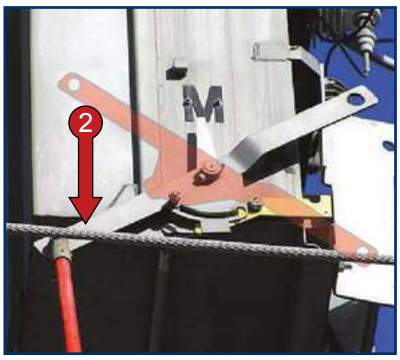
Functions: Opening, Closing
Rating: Various
Insulant: SF6
Voltage: 22 kV

Closing the Gas Switch / Sectionaliser

1 Place the HV operating stick pin onto the M/A operating lever.

2 Pull down the M/A operating lever to the stop position as shown to **CLOSE** the gas switch / sectionaliser.

3 Confirm the open/close semaphore agrees with the gas switch/sectionaliser status.

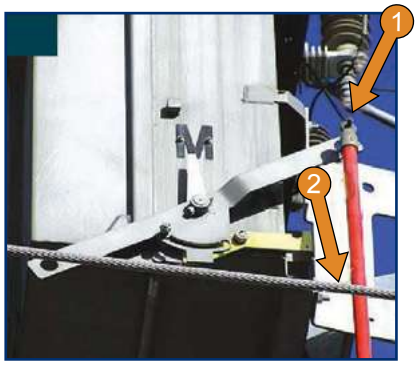


Setting the Gas Switch / Sectionaliser

1 Place the HV operating stick pin onto the M/A operating lever as shown.

2 Pull down the M/A operating lever to the stop position.

3 Confirm the indicator is pointing to **A** (Auto).



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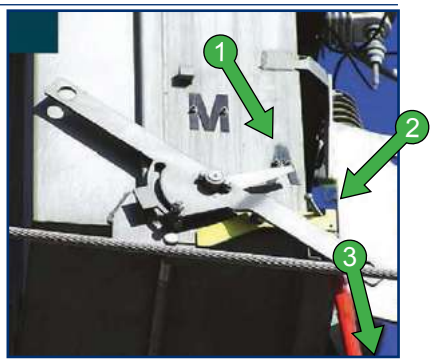
NULEC L24 GAS SWITCH / SECTIONALISER (CONTINUED)

Opening the Gas Switch / Sectionaliser



1 Confirm the indicator is pointing to **A** - Auto.

2 Place the HV operating stick pin onto the yellow operating lever as shown.

3 Pull down the yellow operating lever to the stop position to **OPEN** the gas switch/sectionaliser.

4 Confirm the open/close semaphore agrees with the gas switch/sectionaliser status.

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NULEC RL LOAD BREAK SWITCH / SECTIONALISER

Prior to any operation:

- Remote operation is always the preferred method.
- Ensure the remote operation function is disabled prior to any local manual operation. Refer to the: Nulec CAPM5 Electronic Recloser Control template in the Control Boxes section of this manual for local electrical operating instructions.
- This unit may be used as an LBS or sectionaliser.

Functions:	Opening – HV Operating Stick, Closing – HV Operating Stick
Rating:	630 amps
Insulant:	SF6
Voltage:	22kV

Closing the Switch – Local Manual

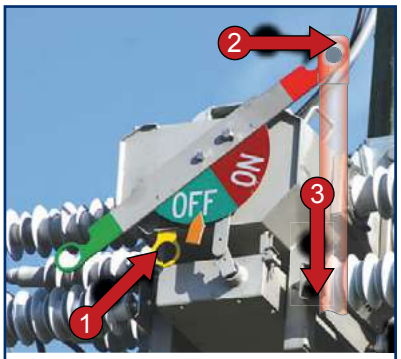
1 Confirm the yellow operating lock out lever is in the fully raised position as shown.

2 Place the HV operating stick pin onto the red (raised) end of the manual operating lever.

3 Pull down the manual operating lever to the stop position to CLOSE the switch.

4 Remove the HV operating stick.

5 Confirm the switch has closed correctly via the semaphore pointing to ‘ON’ as shown.



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NULEC RL LOAD BREAK SWITCH / SECTIONALISER (CONTINUED)

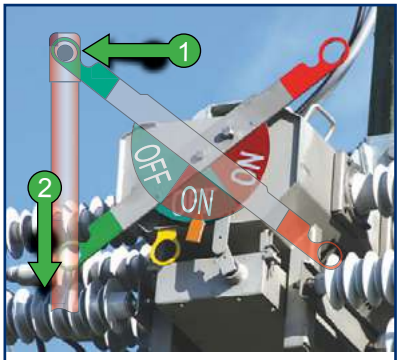
Opening the Switch - Local Manual

1 Place the HV operating stick pin onto the green (raised) end of the manual operating lever.

2 Pull down the manual operating lever to the stop position to **OPEN** the switch.

3 Remove the HV operating stick.

4 Confirm the switch has opened correctly via the semaphore pointing to 'OFF' as shown.



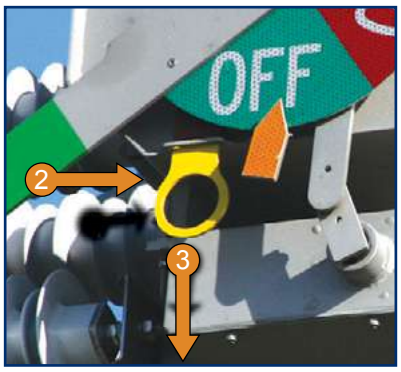
Locking the Switch in the Open Position

1 Confirm the switch is open.

2 Place the HV operating stick pin onto the yellow operating lockout lever.

3 Pull down the operating lockout lever to the stop position to lock the switch in the open position.

4 Remove the HV operating stick.

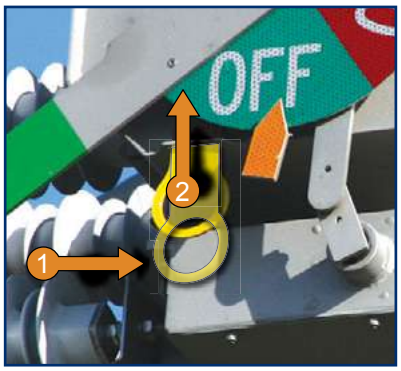


Unlocking the Switch

1 Place the HV operating stick pin onto the yellow operating lockout lever.

2 Push up the operating lockout lever to the stop position to unlock the switch.

3 Remove the HV operating stick.



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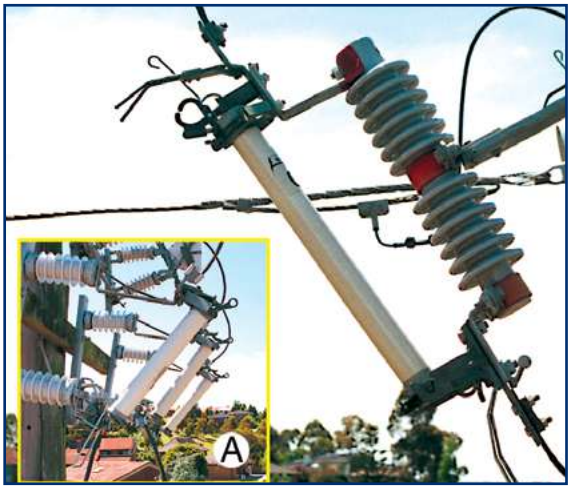
POWDER FILLED HV FUSES

Functions:	Opening, Closing, HV Fuses
Rating:	Various
Insulant:	Air
Voltage:	22kV, 11kV, 6.6kV

Prior to any operation:

- After removing HV fuses care should be taken prior to handling as fuses may be hot.
- Telescopic operating sticks shall NOT be used to remove or replace Powder Filled Fuses.
- Fuses may vary in colour as well as rating. HV fuse mounting fittings may also vary in design however operating principles remain the same.
- Inset photo on right shows larger 3 inch (76 mm) diameter fuses.
- Ensure HV stick movement maintains pressure on HV fuse lower hinged fitting during opening/closing.



Closing HV Fuse

1 Place HV operating stick pin in HV Fuse operating eye hole.

2 Raise HV fuse and push firmly **CLOSED**.

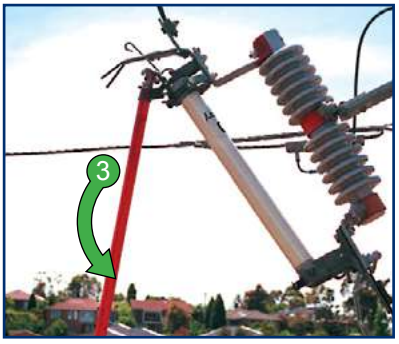
3 Ensure fuse fitting has latched correctly by inserting HV operating stick pin in arcing horn wire loop behind operating eye hole.

Opening HV Fuse

1 Place HV operating stick pin in HV Fuse operating eye hole.

2 Push HV fuse to release pressure on latching mechanism.

3 'Crack / inch' **OPEN** HV fuse and if in order fully lower HV fuse.



Removing HV Fuse

1 With HV fuse in the open position place HV operating stick pin in HV fuse hinge operating eye hole.

2 Lift HV fuse out of hinge mechanism and remove.

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REYROLLE OYT ACR

Prior to any operation:

- Confirm the ACR is fit for service prior to and after any operation.
- If the power supply to the ACR is via a SWER transformer perform a 'Safe to Approach' test prior to operation.
- This ACR can be operated manually or electrically. Electrical operation is the preferred method of operation.
- Confirm the ACR location and labelling prior to operation.
- Ensure the auto reclose is suppressed prior to operation of the ACR.

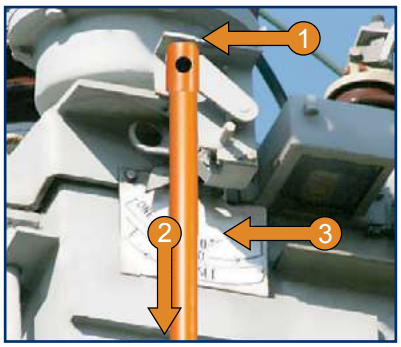
Functions:	Opening - HV Op Stick / Local Electrical, Closing - HV Op Stick / Local Electrical, Isolation, E/F Protection, Auto Reclose
Rating:	Various
Insulant:	Oil
Voltage:	22kV

Suppressing the ACR Auto Reclose

1 Place the operating stick pin into the OUTER operating lever eye hole as shown.

2 Pull down the operating lever to the stop position to suppress the ACR auto reclose.

3 At the completion of the operation the indicating lever will point to the 'ONE TRIP TO LO' arrow. The inner operating lever will also move down app. 30 degrees.

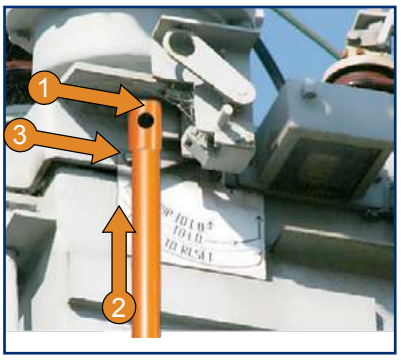


Restoring the ACR Auto Reclose

1 Place the operating stick pin under the INNER operating lever eye hole as shown.

2 Push up the operating lever to the stop position to restore the ACR auto reclose.

3 At the completion of the operation the indicating lever will point to the beginning of 'ONE TRIP TO LO' as shown



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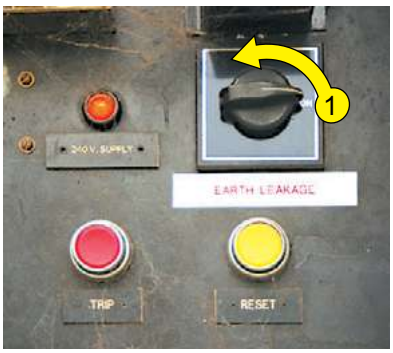
REYROLLE OYT ACR (CONTINUED)

Suppressing the ACR Earth Leakage Prot.

1 Rotate the 'EARTH LEAKAGE' control switch ACW to the 'OFF' position to suppress the ACR earth leakage protection.



Closing the ACR – Manually

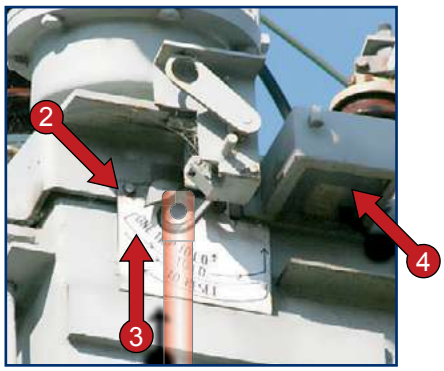
Note: *A pulsing noise will be heard when the solenoid pumps up to perform the closing operation.*

1 Confirm the ACR auto reclose is suppressed.

2 Place the operating stick pin into the INNER operating lever eye hole as shown.

3 Push up the operating lever to the stop position and hold for approximately five (5) seconds to **CLOSE** the ACR.

4 Confirm the semaphore agrees with the ACR status.



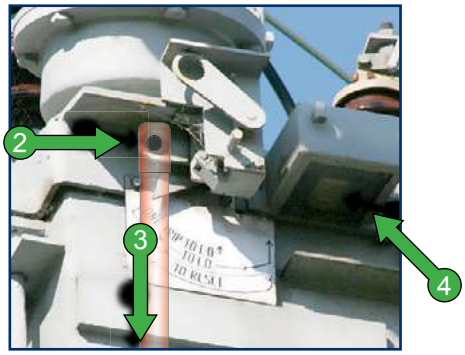
Opening the ACR - Manually

1 Confirm the ACR auto reclose is suppressed.

2 Place the operating stick pin into the INNER operating lever eye hole as shown as shown.

3 Pull down the operating lever to the stop position to **OPEN** the ACR.

4 Confirm the semaphore agrees with the ACR status.



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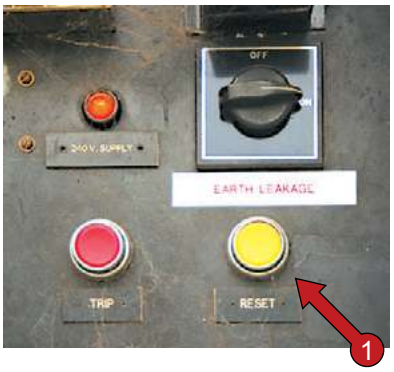
REYROLLE OYT ACR (CONTINUED)

Closing the ACR - Electrically

1 Press the yellow ‘RESET’ button to CLOSE the ACR.

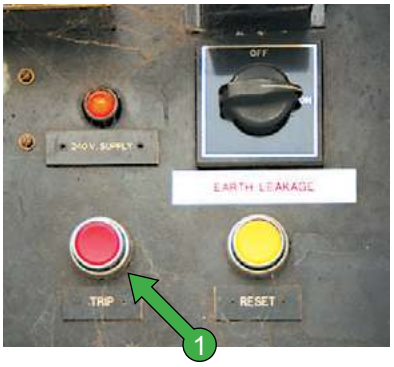
2 Confirm the semaphores agree with the ACR status.



Opening the ACR - Electrically

1 Press the red ‘TRIP’ button to OPEN the ACR.

2 Confirm the semaphores agree with the ACR status.



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RV ACR

Prior to any operation:

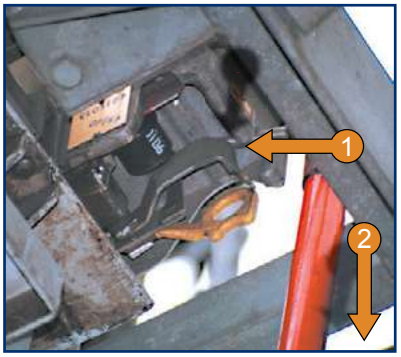
- Confirm the ACR is fit for service prior to and after any operation.
- The RV ACR is operated manually except for those units constructed with the ex 'SECV' type control box. Instructions for both are shown below.
- Confirm the ACR location and labelling prior to operation.
- Check / confirm oil levels gas pressure labelling
- The auto reclose must be suppressed if closing after lockout operation.

Functions: Opening, Closing, Auto Reclose, Earth Fault prot., O/C Prot.
Rating: Various
Insulant: Oil
Voltage: 22kV

Suppressing the ACR Auto Reclose

1 Place the HV switch stick operating pin onto the INNER grey operating lever as shown.

2 Pull down the grey operating lever to the stop position to suppress the ACR auto reclose.

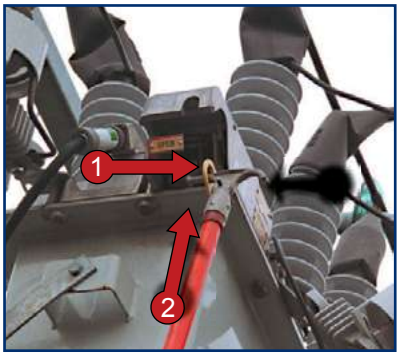


Closing the ACR – Manually

1 Insert the HV switch stick operating pin into the yellow operating lever eye hole as shown.

2 Push up the yellow operating lever to the stop position to CLOSE the ACR.

3 Confirm the semaphore agrees with the ACR status.



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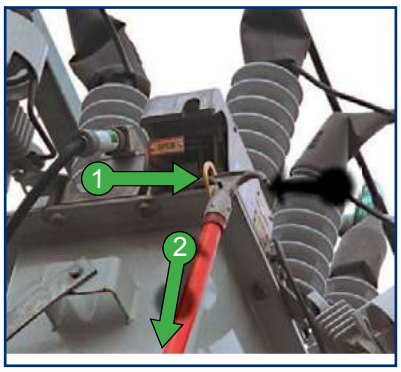
RV ACR (CONTINUED)

Opening the ACR - Manually

1 Insert the HV switch stick operating pin into the yellow operating lever eye hole.

2 Pull down the yellow operating lever to the stop position to OPEN the ACR.

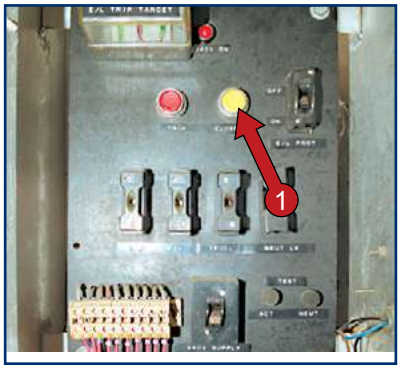
3 Confirm the semaphore agrees with the ACR status.



Closing the ACR - Electrically (Ex SECV C'Box).

1 Press the yellow 'CLOSE' button to CLOSE ACR.

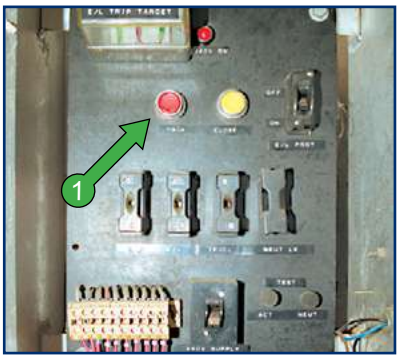
2 Confirm the indicating lights / semaphores agree with the ACR status.



Opening the ACR - Electrically (Ex SECV C'Box)

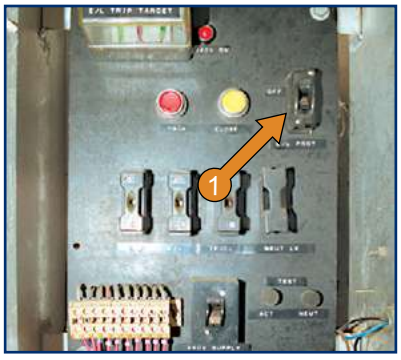
1 Press the red 'TRIP' button to OPEN the ACR.

2 Confirm the indicating lights / semaphores agree with the ACR status.



Suppressing the ACR Earth Leakage Prot.

1 Raise the earth leakage protection 'ON/OFF' switch to the 'OFF' position to suppress the ACR earth leakage protection.



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RVE/VWVE ACR

Prior to any operation

- Electrical operation of the RVENWVE ACR is the preferred method of operation. Refer to the RVE/VWVE Electronic Control Box template in this manual for electrical operation details.
- The RVE/VWVE ACR does not have a manual auto reclose suppression operating lever.
- The RVE/VWVE ACR has a manual lock out lever as shown in the 'Opening ACR - Manually' instruction below.
- Confirm the ACR location and labelling prior to operation.
- Manual opening only to be used if the ACR cannot be operated from the control box.

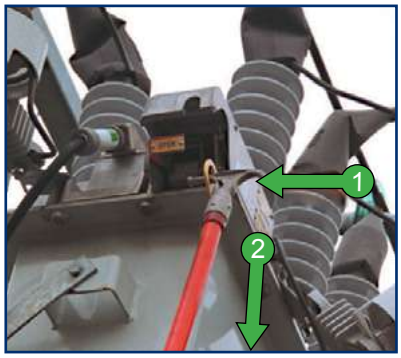
Functions: Opening, Closing
Rating: Various
Insulant: Vacuum/Oil
Voltage: 22kV, 11kV

Opening the ACR – Local Manually

1 Place the HV switch stick operating pin into the yellow operating lever eye hole as shown.

2 Pull down the yellow operating lever to the stop position to **OPEN** the ACR.

3 Confirm the semaphores agree with the ACR status.



Closing the ACR - Local Manually

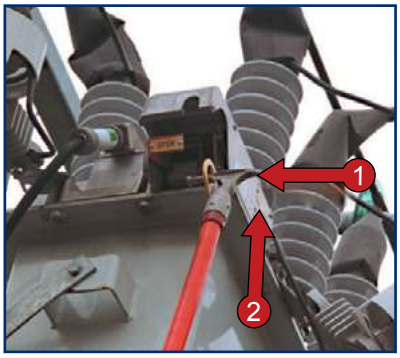
Closing the ACR manually can only be done if the control box fails and only after direction from control room.

Auto reclose must be suppressed in the control box prior to closing.

1 Place the HV switch stick operating pin into the yellow operating lever eye hole as shown.

2 Push up the yellow operating lever to the stop position to **CLOSE** the ACR.

3 Confirm the semaphores agree with the ACR status.



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S & C FAULT TAMER

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	Various
Insulant:	Air
Voltage:	22kV, 11kV

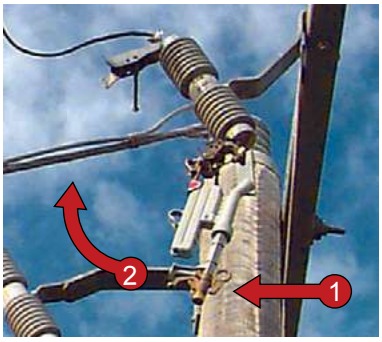
Prior to any operation:

- The Fault Tamer assembly should not be left in the open position for extended periods of time as water may enter and damage the HV fuse.
- After removing the Fault Tamer assembly care should be taken prior to handling as the HV fuse unit may be hot.
- Ensure the HV stick movement maintains pressure on the Fault Tamer lower hinged fitting during opening and closing.
- Testing of the back-up limiter must be performed after every Fault Tamer operation.

Closing the Fault Tamer

1 Place the HV operating stick pin in the Fault Tamer operating eye hole.

2 Raise the Fault Tamer and push firmly closed.

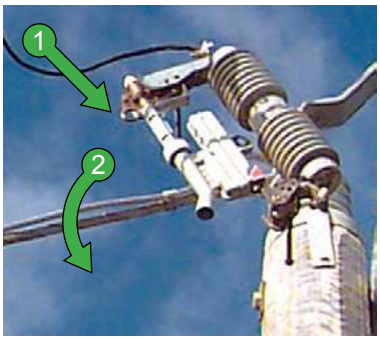


Opening the Fault Tamer

1 Place the HV operating stick pin in the Fault Tamer operating eye hole.

2 'Crack / inch' open the Fault Tamer and if in order fully lower the Fault Tamer.

Note: *The Fault Tamer assembly should not be left in the open position for extended periods of time as water may enter and damage the HV fuse tube.*

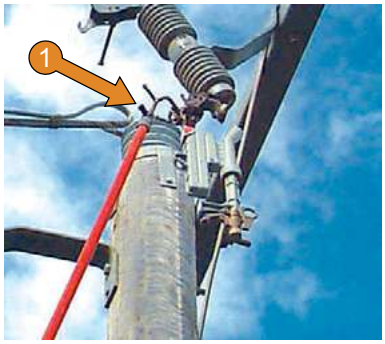


Removing the Fault Tamer

1 With the Fault Tamer in the open position, place the HV operating stick pin in the Fault Tamer hinge operating eye hole.

2 Lift the Fault Tamer out of hinge mechanism and remove.

Warning: *The Fault Tamer may be hot.*



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S & C FAULT TAMER (CONTINUED)

Changing the HV Fuse Element

1 Unscrew the collar nut and remove the fuse tube from the back of the limiter assembly.

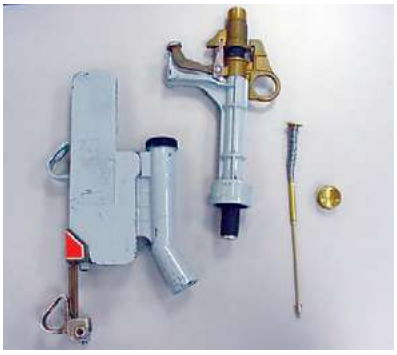
TESTING THE BACK-UP LIMITER HV FUSE

2 Using a multi-meter on the continuity setting test the back-up limiter HV fuse by placing the test probes on the button contact (1) and the trunnion (2) as shown in the photograph. If the back-up limiter does not have contnuity, remove the trunnion and discard the limiter.

3 Unscrew the fuse tube cap.

4 Remove the spring and cable assembly (and blown fuse debrs)

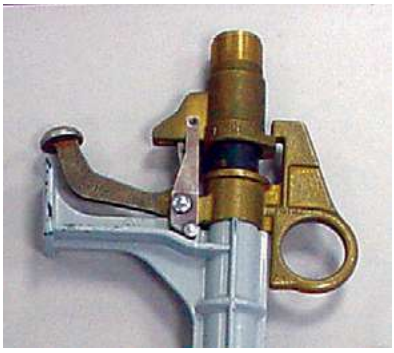
5 Remove any debris from the fuse tube bore.



Note: *Check the condition of the spring and cable assembly and if damaged replace.*

6 Push the upper ferrule down to the stop position (latched).

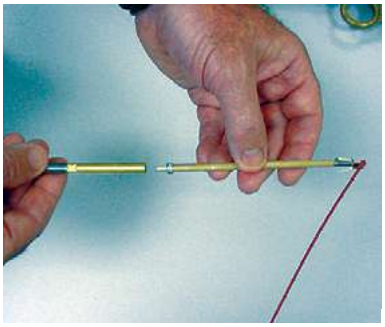
Note: *Ensure the ferrule is latched correctly prior to insertion of the new fuse element assembly.*



7 Screw a new fuse cartridge into the spring and cable assembly.

8 Rotate the red beaded pull tab so that it aligns with the fuse cartridge assembly.

Note: *Ensure the fuse cartridge is screwed in to the spring and cable assembly until the thread bottoms.*



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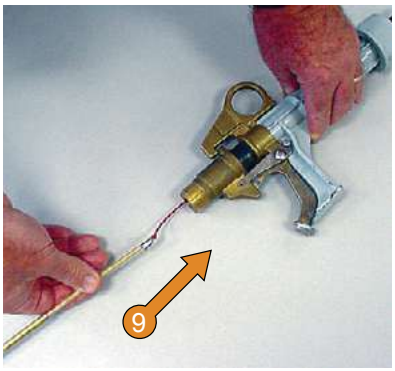
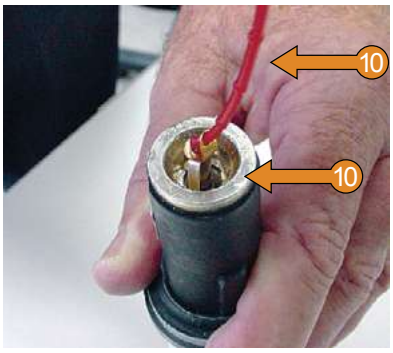
S & C FAULT TAMER (CONTINUED)

9 Insert the fuse cartridge/spring and cable assembly into the fuse tube as shown and screq on the fuse tube cap and tighten securely.

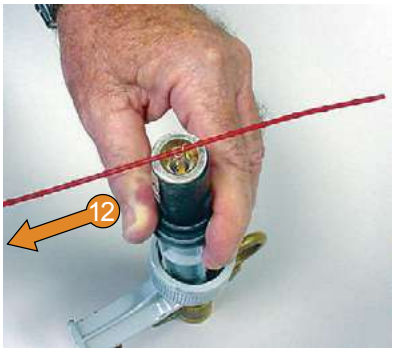


10 Using the red beaded pull tab carefully pull the fuse cartridge through the fuse tube sgsindt the spring tension until the contact fingers epand on the rig contact.

11 Slowly release pressure on the pull tab allowing the contact fingers to seat on the contact ring.



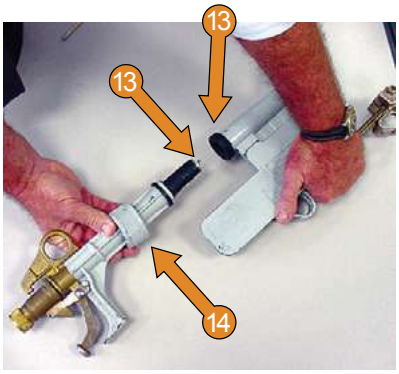
Note: *Avoid any jerking motion or excessive over travel when pulling through the fuse cartridge.*



12 Carefully remove the red beaded pull tab as shown in the photograph.

13 Align the keyways on the fuse tube with the notches in the exhaust control device.

14 Insert the fuse tube into the exhaust control device and hand tighten the collar nut.



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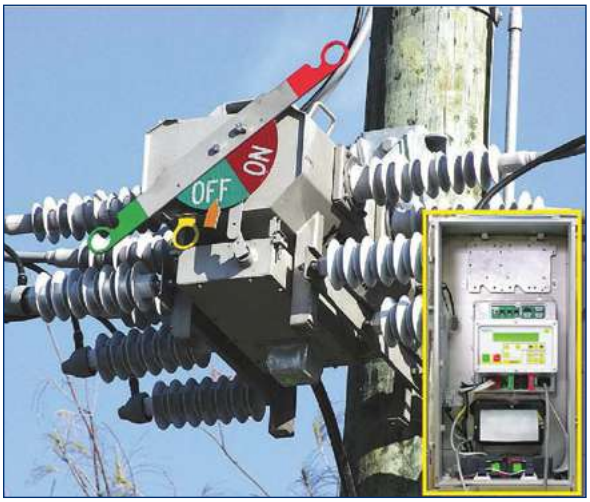
SCHNEIDER (NULEC) RL 27 GAS SWITCH

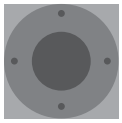
Prior to any operation

- Confirm the gas switch is fit for service prior to and after any operation.
- Remote operation is always the preferred method of operation.
- The remote operation function must be disabled before any local operation can take place.
- Refer to the:Schneider Nulec ADVC 2 Electronic Control Box template in this manual for electrical operating details.
- Confirm the gas switch location and labelling prior to any operation.
- Do not operate the gas switch if the low SF6 gas pressure indicator displays a red semaphore.

Functions: Opening, Closing
Rating: 630 Amps
Insulant: SF6
Voltage: 22 kV



Operating Semaphores

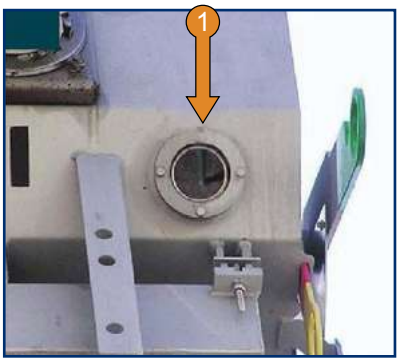


SF Gas
Pressure NORMAL

SF Gas
Pressure LOW
DO NOT OPERATE

Confirming the Correct SF6 Gas Pressure

1 Confirm the low SF6 gas pressure indicator does not show a red semaphore.



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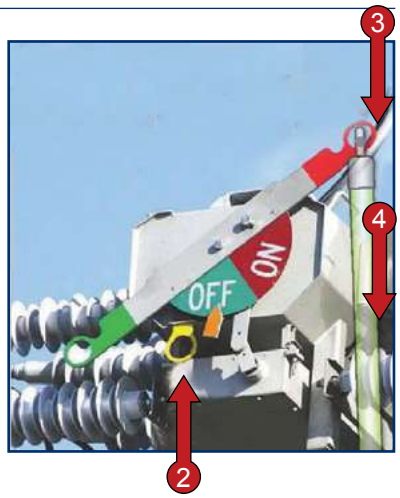
SCHNEIDER (NULEC) RL 27 GAS SWITCH (CONTINUED)

Closing the Gas Switch – Manually



1 Confirm the remote operation function is disabled.

2 Confirm the yellow operating lock out lever is in the fully raised position as shown.

3 Place the HV operating stick pin onto the red (raised) end of the manual operating lever.

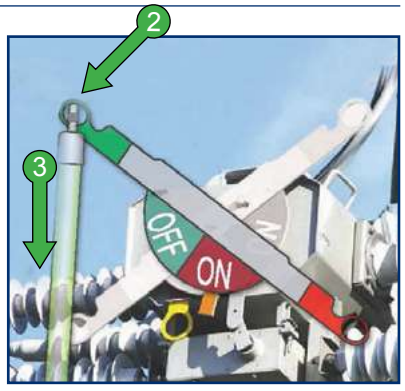
4 Pull down the manual operating lever to the stop position to **CLOSE** the switch.

5 Remove the HV operating stick.

6 Confirm the gas switch has closed correctly via the mechanical indicator pointing to 'ON' as shown.

- For access permit isolation the remote control function must be disabled regardless of the mechanical lockout status.

Opening the Gas Switch – Manually



1 Confirm the remote operation function is disabled

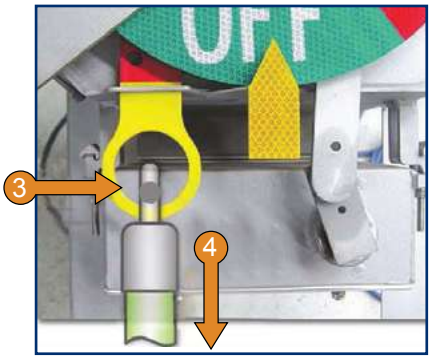
2 Place the HV operating stick pin onto the green (raised) end of the manual operating lever.

3 Pull down the manual operating lever to the stop position to **OPEN** the switch.

4 Remove the HV operating stick.

5 Confirm the gas switch has opened correctly via the mechanical indicator pointing to 'OFF' as shown.

Locking the Gas Switch in the Open Position



1 Confirm the remote operation function is disabled.

2 Confirm the gas switch is open.

3 Place the HV operating stick pin onto the yellow operating lockout lever.

4 Pull down the operating lockout lever to the stop position to lock the switch in the open position.

5 Remove the HV operating stick.

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SCHNEIDER (NULEC) RL 27 GAS SWITCH (CONTINUED)

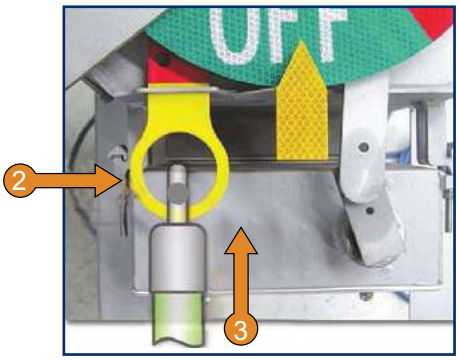
Unlocking the Gas Switch

1 Confirm the remote operation function is disabled.

2 Place the HV operating stick pin onto the yellow operating lockout lever.

3 Push up the operating lockout lever to the stop position to unlock the switch.

4 Remove the HV operating stick.



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SCHNEIDER NULEC W SERIES REMOTE CONTROL SWER ACR

Prior to any operation

- There is no Earth Leakage on these units.
- Electrical operation is the preferred method of operation on these SWER ACR's
- Please refer to the Schneider Nulec ADVC 2 Electronic control box in the Control Box section of this manual for electronic operation.
- Confirm HV switch location and labelling prior to operation.
- Ensure the ACR Auto Reclose is suppressed prior to closing the By-pass fuse.

Functions: Auto Reclose, Opening, Closing,
Rating 24kV
Insulant: Vacuum Interupter
Voltage: 12.7 kV

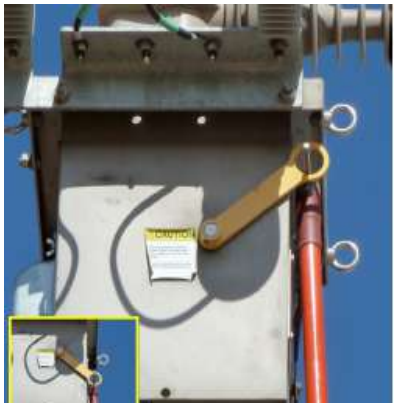
Opening ACR Manually (Use only if control box has failed)

1 Place the HV operating stick into the yellow operating lever as shown.

2 To OPEN ACR gently pull down on the yellow lever quickly and firmly untill it stops (inset)

3 Confirm the semaphore points to the "O" (open) position.

4 Once opened slowly push the manual operating handle to the up position. If the manual handle is left slightly in the down position it will make the electronic closing in-operable.



Note: *You CANNOT close the ACR via the manual operating handle. Closing must be done via the electronic control box.*

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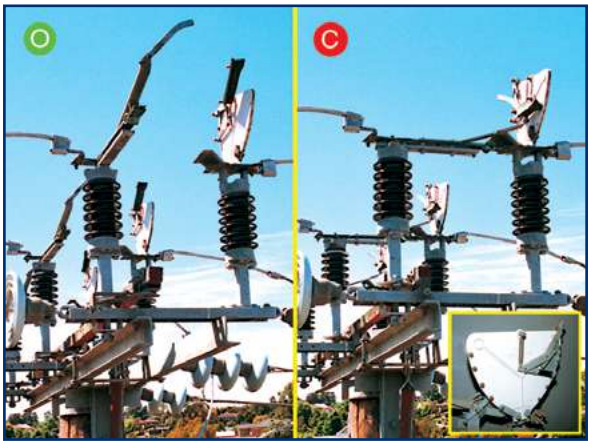
SIDE THROW GAC

Prior to any operation:

- Confirm HV switch is fit for service prior to and after operation.
- Operating handles may differ in construction however operating principles remain the same regardless of GAC make or voltage.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	400 amps
Insulant:	Air
Voltage:	22kV, 11kV



Closing HV Switch

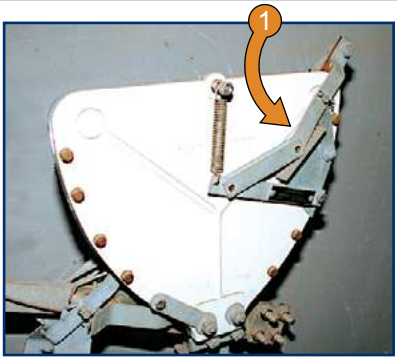
1 Remove operating handle padlock.

2 Lower operating handle firmly to stop position to **CLOSE** HV switch.

3 Confirm HV switch is closed and latched correctly.

Arc Chute Latching

1 Prior to opening HV switch confirm arc chute latching elbow is over-centre as shown.



Opening HV Switch

1 Remove operating handle padlock.

2 Raise operating handle firmly to stop position to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.

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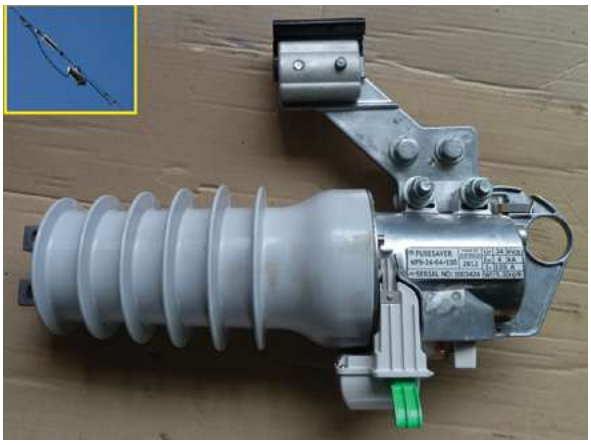
SIEMENS 3AD8 FUSESAVER & SWER ACR OCO

Prior to any operation:

- Not to be used as an isolation point.
- **FUSESAVER** configured units operate by detecting a fault on a fused spur/line and open for approximately 10 sec's then close. If the fault is still present or cleared the unit stays closed. Where the fault is present the fuse will operate.
- **ACR** configured units detect a fault and open for approximately 10 sec's before reclosing.
- If the fault is still detected the unit immediately opens and will stay open.
- If the fault has cleared the units will remain closed.
- The Work Tag/LLS feature which can be initiated by local or remote control.

Function:	**FUSESAVER** Saving fuse operations on fused spurs **SWER ACR OCO** Opening, Closing and Fault Interruption
Rating:	4KA
Insulant:	Vacuum Circuit Breaker
Voltage:	24kV



Manually Opening the Fusesaver and ACR Units

1 Press the Green lever up with an operating stick to open.

2 Red LED will flash for approximately 3-4 sec's then flash every 2 seconds until opened. (approximately 40 to 60 seconds)

3 Move away from unit.

4 When the unit has opened the semaphore will change to Green.

Manually Closing the Fusesaver and ACR Units

1 Press the Red lever up with an operating stick.

2 Red LED will flash for approximately 3-4 sec's then flash every 2 seconds until opened. (approximately 40 to 60 second)

3 Move away from units.

4 When the unit has closed the semaphore will change to Red.

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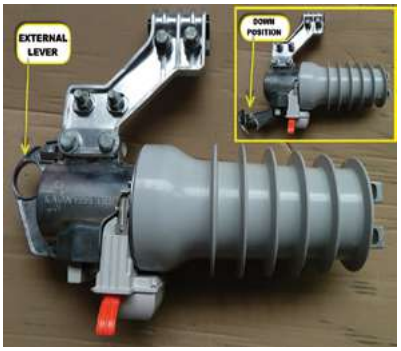
SIEMENS 3AD8 FUSESAVER & SWER ACR OCO (CONTINUED)

FUSESAVER – Overriding the Opening or Closing Sequence and Disabling the Unit



To override the opening or closing sequence:

1 Place the operating stick into the external lever and gently pull down on all units.

2 Once in the down position the opening or closing sequence will be stopped during the 40 to 60 sec opening/closing sequence on all units.

To disable the units from detecting a fault:

1 Place the operating stick into the external lever and gently pull down on all units.

2 Once in the down position the units will not detect a fault and open on all units.

SWER ACR OCO – Manually enabling and disabling the Work Tag/LLS feature

To enable the Work Tag/LLS feature:

1 Place the operating stick into the external lever and gently pull down.

2 Once in the down position the unit will have Work Tag/LLS feature enabled (Fast Single Shot Active).

To disable the Work Tag/LLS feature:

1 Place the operating stick into the external lever and gently push lever into the upright position.

Control Module

1 To disable the **FUSESAVER** opening & closing, gently pull the external lever down.

2 Pull control module straight down with adaptor stick or use G & B methods.

3 Replace with new control module by gently pushing up into position and align with the 3 pins. (See Inset)

4 To enable the **FUSESAVER** opening & closing, gently push the external lever up until latched.

Note: ***SWER ACR*** *configured units will still operate if a fault is detected when the Control Module is removed.*

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SIEMENS PORTABLE MID SPAN GANGED SWITCH

Prior to any operation:

- Identified by orange coloured head.
- Ensure all 3 units are communicating with each other via Bluetooth.

  Note: This device cannot be used as an isolation point - inline HV isolators or G&B work methods must be used to create an isolation point.

  When installed on 2 wire HV networks, the third unit must be positioned in close proximity so it can be detected (Bluetooth) by other units.

  The uninstalled third unit must be safely secured in a controlled environment as it will open and close in coordination with the two installed units

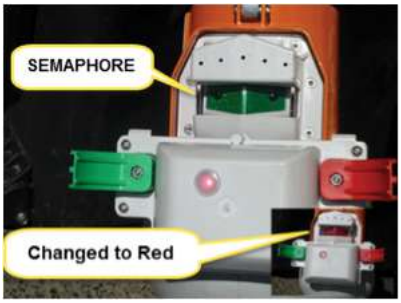
- 60 second Opening and Closing sequence can be stopped during sequence.

Functions:	Load Break Opening & Closing
Rating:	400A
Insulant:	Vacuum Interrupter
Voltage:	27kV

Manually Opening the Units (GREEN)

1. Press one of the Green levers up with an operating stick.
2. Red LED will flash for approx 3-4 seconds then flash every 2 seconds. Wait and the other 2 units will start flashing every 2 seconds which indicates that they are all synced. A 60 second time period will commence then all 3 units will Open.
3. Move away from units during 60 second period.
4. The semephore will change to Green on all 3 units after the 60 seconds and all units will be Open.

Manually Closing the Units (RED)



1. Press one of the Red levers up with an operating stick.
2. Red LED will flash for approx 3-4 seconds then flash every 2 seconds. Wait and the other 2 units will start flashing every 2 seconds which indicates they are all synced. A 60 second time period will commence then all 3 units will Close.
3. Move away from units during 60 second period.
4. The semaphore will change to Red on all 3 units after the 60 seconds and all units will be Open.

SIEMENS PORTABLE MID SPAN GANGED SWITCH

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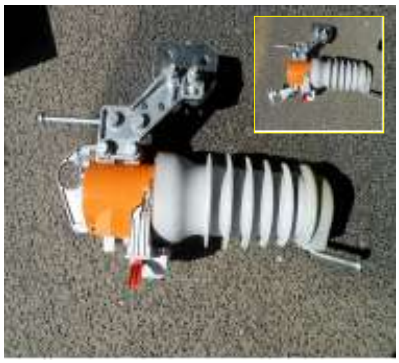
SIEMENS PORTABLE MID SPAN GANGED SWITCH (CONTINUED)

Overriding the Opening or Closing Sequence



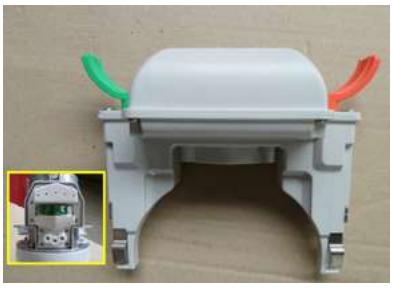
1 Place the operating stick into the external lever and gently pull down on all 3 units.

2 Once all 3 levers are in the down position, the opening or closing sequence will be stopped during the 60 second opening/closing sequence on al units.

3 To enable units again, gently press up external lever on all 3 units.

Note: *During the Opening or Closing process if the LED's on each unit are not flashing, stop the process by gently pulling down on the external levers on each unit. Then place external lever on each unit back into the latched closed position again and start the Opening or Closing process again.*

Inserting or Replacing the Control Module



1 Disable the Opening and Closing sequence as described above.

2 Pull the control module straight down with the adaptor stick or G&B methods.

3 Replace with new control module by gently pushing up into position and align with the 3 pins. (See Inset).

4 Enable opening/closing by gently pushing the external lever up.

Note: *Remove and replace all control modules as they will need to re-establish communication and pair up prior to being operated again (Approx. 2 minute wait)*

Checking Control Module Battery Life

1 Prior to installation of the Portable Ganged Switch, take the control module out of each unit.

2 Press both Green and Red levers at the same time.

3 The LED flashes brightly once and then flashes rapidly while the test is underway. At the end of the test the LED will blink in a sequence from 5 to 0 times to indicate the battery level.

Number of Blinks	Means
No Blink	Totally flat battery. (FAIL. DO NOT USE.)
1 Blink	Very low battery. (FAIL. DO NOT USE.)
2 Blinks	Battery very low and nearing end of life.
3 Blinks	Battery ok
4 Blinks	Battery well charged
5 Blinks	Battery fully charged.

Repeat for each Control Module unit.

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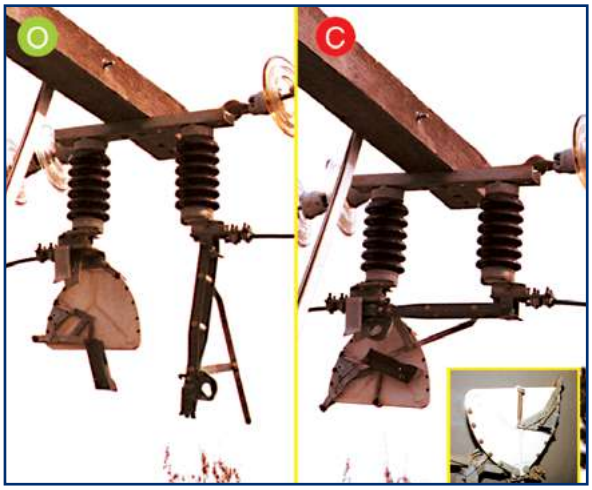
SINGLE PHASE ARC CHUTE SWITCH

Prior to any operation:

- Confirm HV switch is fit for service prior to and after operation.
- Confirm switch location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	400 amps
Insulant:	Air
Voltage:	22kV, 11kV, 6.6kV

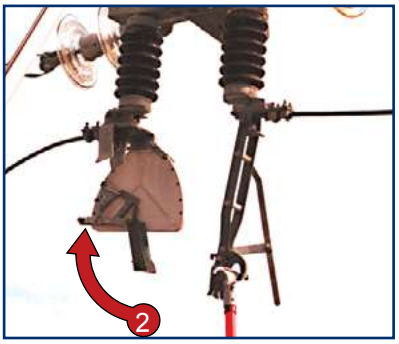


Closing HV Switch

1 Place HV operating stick pin into operating eye hole.

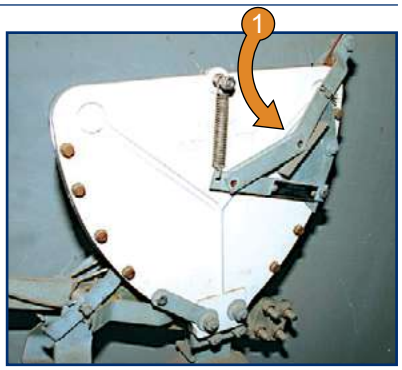
2 Push upwards firmly to stop position to **CLOSE** HV switch.

3 Confirm switch is closed and check flicker blade is latched correctly.



Arc Chute Latching

1 Prior to opening HV switch confirm arc chute latching elbow is over-centre as shown.

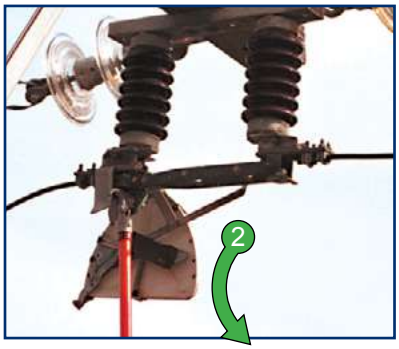


Opening HV Switch

1 Place HV operating stick pin into operating eye hole.

2 Pull downwards firmly to **OPEN** HV switch.

3 Confirm HV switch has opened correctly.



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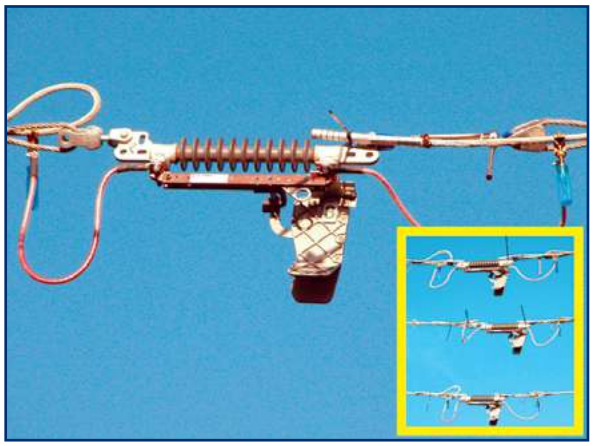
STANGER MID SPAN ISOLATORS

Prior to any operation:

- Confirm the isolators have been cut in and the conductors tied back prior to operating.
- When opening and closing the isolators ensure the HV operating stick movement DOES NOT cause the conductors to swing.
- Confirm the isolators have latched correctly prior to and after operation.
- Confirm HV switch is fit for service prior to and after operation.

Functions:	Opening, Closing
Rating:	250 amps
Insulant:	Air
Voltage:	22kV, 11kV, 6.6kV

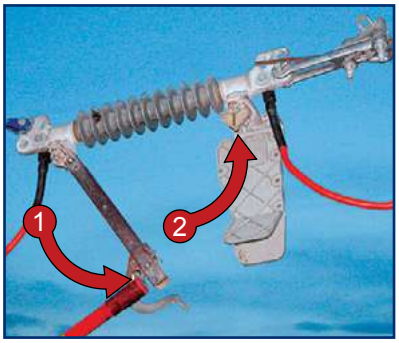


Closing the Mid Span Isolator

1 Place the HV operating stick pin in Mid Span Isolator operating eye hole.

2 Push firmly to **CLOSE** the Mid Span Isolator.

3 Confirm the Mid Span Isolator has latched correctly.

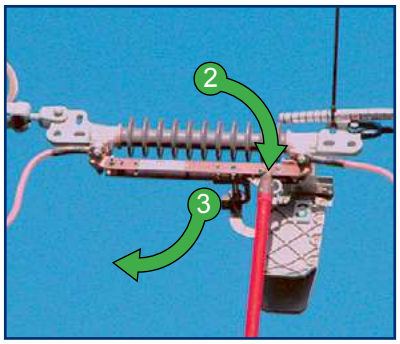


Opening the Mid Span Isolator

1 Confirm the Mid Span Isolator arc chute is latched correctly.

2 Place the HV operating stick pin in Mid Span Isolator operating eye hole.

3 Pull the Mid Span Isolator fully **OPEN**.



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TRINETICS VACUUM SWITCH

Prior to any operation:

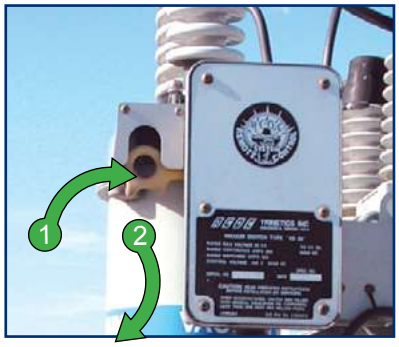
- Ensure all three (3) vacuum switches are opened / closed correctly. Electrical operation is always the preferred method.
- For electrical operation of these vacuum switches refer to the relevant templates in this manual:
- Confirm the capacitor bank location and labelling prior to operation. Electrical operation is always the preferred method. Ensure all three (3) vacuum switches are opened correctly.

Functions:	Opening, Closing
Rating:	200 amps
Insulant:	Vacuum
Voltage:	22kV, 11kV

Opening the Vacuum Switches - Manually

1 Place the HV operating stick pin in the yellow eye hole of the vacuum switch operating lever.

2 Lower the yellow operating lever to the stop position to **OPEN** the vacuum switch.



Closing the Vacuum Switches - Manually

1 Place the HV operating stick pin in the yellow eye hole of the vacuum switch operating lever.

2 Raise the yellow operating lever to the stop position to **CLOSE** the vacuum switch.

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WHIPP & BOURNE ACR

Prior to any operation:

- Confirm ACR is fit for service prior to and after operation.
- Control relay has programmable default settings. Condition of the protection settings should be checked after each operation.
- Confirm ACR location and labelling prior to operation.
- Manual opening only to be used if ACR cannot be operated from the control box.
- Auto reclose must be suppressed prior to closing ACR

Functions:	Opening, Closing, Auto reclose, Earth Fault Prot., LL Sequences
Rating:	630 amps
Insulant:	SF6, Vacuum
Voltage:	22kV

Closing ACR – Electrically

1 Press the button marked ‘WAKE UP’ to activate ACR control panel.

2 Press the button marked ‘CLOSE’ to **CLOSE** the ACR.

3 Confirm indicator LED and semaphores agree with ACR status.

Opening ACR – Electrically

1 Press the button marked ‘WAKE UP’ to activate ACR control panel.

2 Press the button marked ‘TRIP’ to **OPEN** the ACR.

3 Confirm indicator LED and semaphores agree with ACR status.

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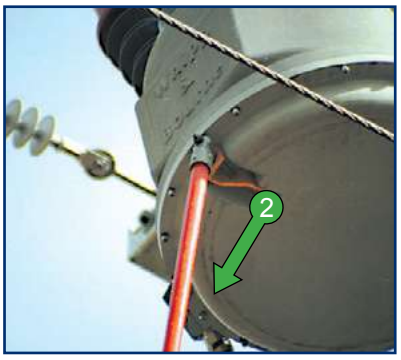
WHIPP & BOURNE ACR (CONTINUED)

Opening ACR - Manually

1 Insert the HV switch stick operating pin into the yellow operating lever eye hole.

2 Pull down the yellow operating lever to stop position to **OPEN** the ACR.

3 Confirm semaphores agree with ACR status.



Suppression of ACR Auto Reclose

1 Press the button marked ‘WAKE UP’ to activate ACR control panel.

2 Press the button marked ‘RECLOSE ENABLED’ to suppress the ACR auto reclose. Press the same button to restore the ACR auto reclose.

3 Confirm indicator LED agrees with auto reclose status.
LED ‘on’ = auto reclose ‘on’.
LED ‘off’ = auto reclose ‘off

Suppression of ACR Earth Leakage Prot.

1 Press the button marked ‘WAKE UP’ to activate ACR control panel.

2 Press the button marked ‘EARTH FAULT ENABLED’ to suppress the ACR earth leakage protection. Press the same button to restore the ACR earth leakage protection.

3 Confirm indicator LED agrees with earth leakage status.
LED ‘on’ = earth leakage protection ‘on’.
LED ‘off’ = earth leakage protection ‘off’.

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WHIPP & BOURNE ACR (CONTINUED)

Suppression of ACR Remote Control

1 Press the button marked ‘WAKE UP’ to activate ACR control panel.

2 Press the button marked ‘REMOTE ENABLED’ and hold for three (3) seconds to suppress the ACR remote control. Press the same button to restore the ACR remote control.

3 Confirm indicator LED agrees with earth leakage status.
LED ‘on’ = remote control ‘on’.
LED ‘off’ = remote control ‘off’.

Enabling of ACR LLS

1 Press the button marked ‘WAKE UP’ to activate ACR control panel.

2 Press the button marked ‘LIVE LINE ENABLED’ to enable the ACR LLS. Press the same button to disable the ACR LLS.

3 Confirm indicator LED agrees with LLS status.
LED ‘on’ = LLS ‘on’.
LED ‘off’ = LLS ‘off’.

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LINE REGULATORS

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COOPER SINGLE PHASE CL-7 VOLTAGE REGULATOR CONTROL

COOPER SINGLE PHASE LINE REGULATORS

CROMPTON GREAVES FG/2/33/200 LINE REGULATOR

CROMPTON PARKINSON POLE MOUNTED REGULATOR

GE SINGLE PHASE VOLTAGE REGULATORS

MCGRAW EDISON SINGLE PHASE: LINE REGULATOR

TMC SWER REGULATOR

TYREE LINE REGULATOR

WILSON FERRANTI LINE REGULATOR

WILSON FULLER REGULATOR

WILSON LINE REGULATOR

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AEI 1964 40781 LINE REGULATOR

Prior to any operation:

- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely effect volts.
- The regulator neutral tap position number is shown on the sign adjacent to the by-pass switch operating handle.

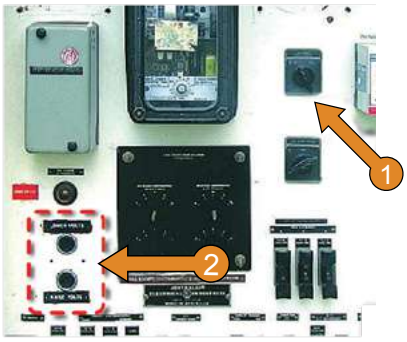
Functions:	Opening, Closing, Isolation, Tap Changing - Electrical / Manual
Rating:	5 kVA
Insulant:	Oil/Air
Voltage:	22 kV

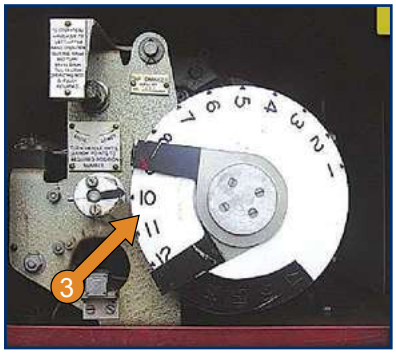
Adjusting the Regulator to Neutral Tap – Electrical

1 Rotate the control selector switch to the ‘MANUAL’ position.

2 Raise / Lower the regulator tap via the voltage control ‘RAISE VOLTS / LOWER VOLTS’ push buttons until the tap indicator points to the neutral tap position.

3 Confirm the correct neutral tap position on the mechanical tap position indicator.





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AEI 1964 40781 LINE REGULATOR (CONTINUED)

Closing the Regulator HV By-pass Switch

Note: *Ensure the regulator is on the neutral tap and LV supply is 'OFF' prior to closing the HV by-pass switch.*

1 Confirm the regulator is on the neutral tap and the LV supply is 'OFF'.

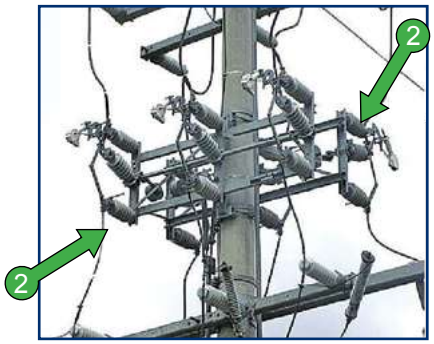
2 **CLOSE** the HV by-pass switch.

Opening the Regulator HV Isolating Switches

Note: *Confirm the HV by-pass switch is closed prior to opening the regulator HV isolating switches.*

1 Confirm the HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operating handle firmly to the stop position to **OPEN** both the regulator HV isolating switches simultaneously.



Changing the Regulator Tap – Manually

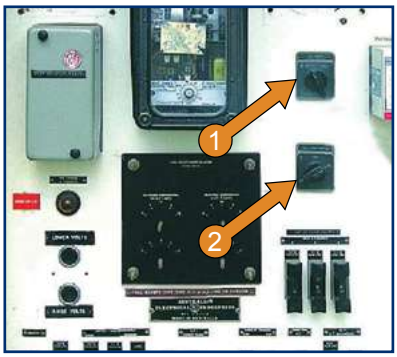
Note: *The regulator by-pass switch MUST NOT BE CLOSED when manually adjusting taps unless the regulator is out of service.*

1 Rotate the control selector switch to the 'MANUAL' position.

2 Switch the 240V supply switch to the 'OFF' position.

3 Open the tap change operating mechanism access door.

4 Move the manual tap change operating handle mechanism access flap to the left Place the manual tap change operating handle onto the operating mechanism as shown.



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AEI 1964 40781 LINE REGULATOR (CONTINUED)

5 Rotate the operating handle in the required direction to raise or lower the regulator tap.

6 Confirm the correct tap position via the mechanical tap position indicator.

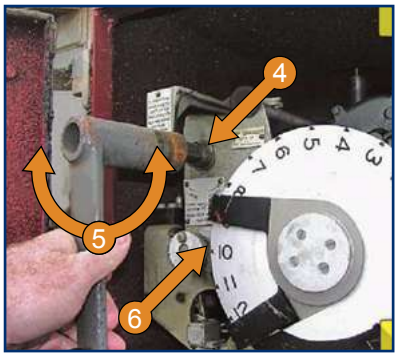
7 If required reset the tap change 'range' indicators.

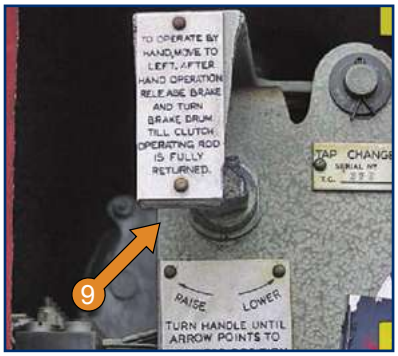
8 Remove the operating handle.

9 Release the mechanism brake and turn the drum until the clutch operating rod is fully returned – the mechanical access flap is returned to the position as shown.

10 Close the access door.

11 If required rotate the control selector switch to the 'AUTO' position and switch the 240V supply switch to the 'ON' position.





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ASEA EH FULLER LINE REGULATOR

Prior to any operation:

- Confirm the regulator and associated apparatus are fit for service prior to and after any operation.
- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely effect volts.
- Note the regulator neutral tap position number is shown on the sign adjacent to the by-pass switch operating handle.

Functions:	Opening, Closing, Isolation, Tap Changing - Electrical / Manual
Rating:	Various
Insulant:	Oil/Air
Voltage:	22kV

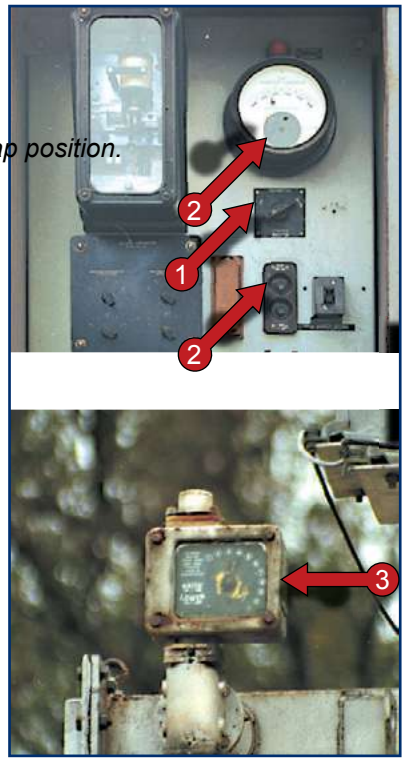
Adjusting the Regulator to Neutral Tap - Electrical

1 Rotate the control selector switch to the ‘MANUAL’ position.

2 Raise / lower the regulator tap via the voltage control ‘RAISE / LOWER’ push buttons until the tap indicator points to the neutral tap position.

Note: *Ensure the mechanical tap position indicator points to the neutral tap position.*

3 Confirm the correct neutral tap position on the mechanical tap position indicator.



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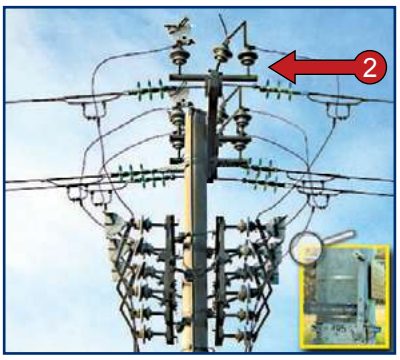
ASEA EH FULLER LINE REGULATOR (CONTINUED)

Closing the Regulator HV By-pass Switch

Note: *Ensure the regulator is on the neutral tap and LV supply is 'OFF' prior to closing the HV by-pass switch.*

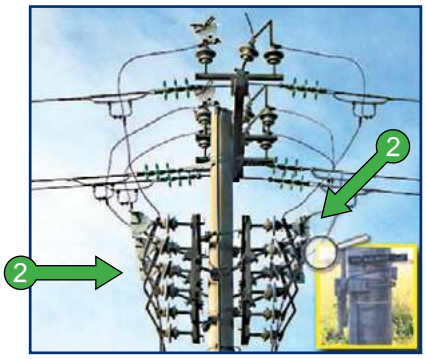


1 Confirm the regulator is on the neutral tap and the LV supply is 'OFF'.

2 **CLOSE** the HV by-pass switch.

Opening the Regulator HV Isolating Switches

Note: *Confirm the HV by-pass switch is closed prior to opening the regulator HV isolating switches.*



1 Confirm the HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operating handle firmly to the stop position to **OPEN** both the regulator HV isolating switches simultaneously.

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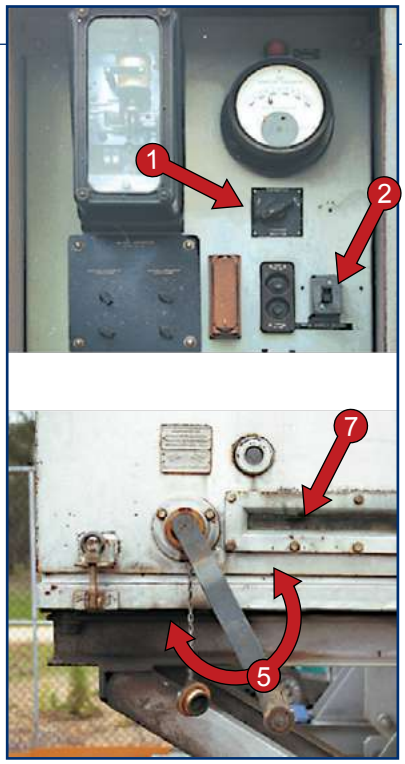
ASEA EH FULLER LINE REGULATOR (CONTINUED)

Changing the Regulator Tap - Manually



1 Rotate the control selector switch to the ‘MANUAL’ position.

2 Switch the 240V supply switch to the ‘OFF’ position.

Note: *The word ‘POSITION’ must be visible in the tap change mechanism viewing window at the completion of the tap change.*

3 Unscrew and remove the manual tap change operating mechanism access cap.

4 Insert the manual tap change operating handle into the operating mechanism.

5 Rotate the operating handle in the required direction to raise or lower the regulator tap.

6 Confirm the correct tap position via the mechanical tap position indicator.

7 Confirm the ‘POSITION’ semaphore is visible.

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ASEA HD FULLER LINE REGULATOR

Prior to any operation:

- Confirm the regulator and associated apparatus are fit for service prior to and after any operation.
- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely effect volts.
- The regulator neutral tap position number is shown on the sign adjacent to the by-pass switch operating handle.

Functions:	Opening, Closing, Isolation, Tap Changing - Electrical / Manual
Rating:	Various
Insulant:	Oil/Air
Voltage:	22kV

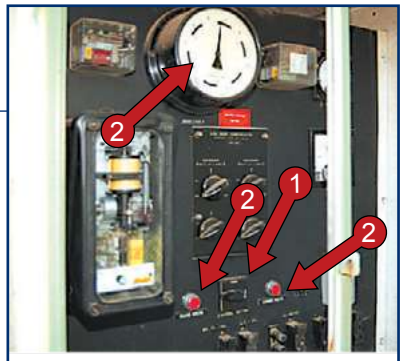
Adjusting the Regulator to Neutral Tap - Electrical

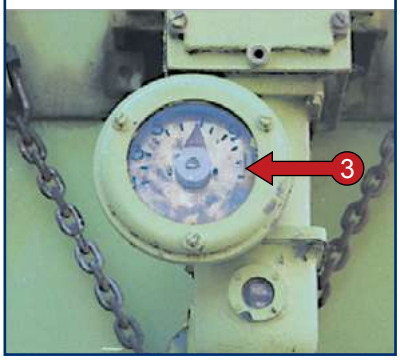
1 Rotate the control selector switch to the ‘MANUAL’ position.

2 Raise / lower the regulator tap via the voltage control ‘RAISE / LOWER’ push buttons until the tap indicator points to the neutral tap position.

Note: *Ensure the mechanical tap position indicator points to the neutral tap position.*

3 Confirm the correct neutral tap position on the mechanical tap position indicator.





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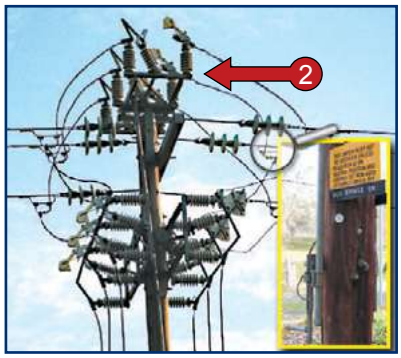
ASEA HD FULLER LINE REGULATOR (CONTINUED)

Closing the Regulator HV By-pass Switch

Note: *Ensure the regulator is on the neutral tap and LV supply is 'OFF' prior to closing the HV by-pass switch.*



1 Confirm the regulator is on the neutral tap and the LV supply is 'OFF'.

2 CLOSE the HV by-pass switch.

Opening the Regulator HV Isolating Switches

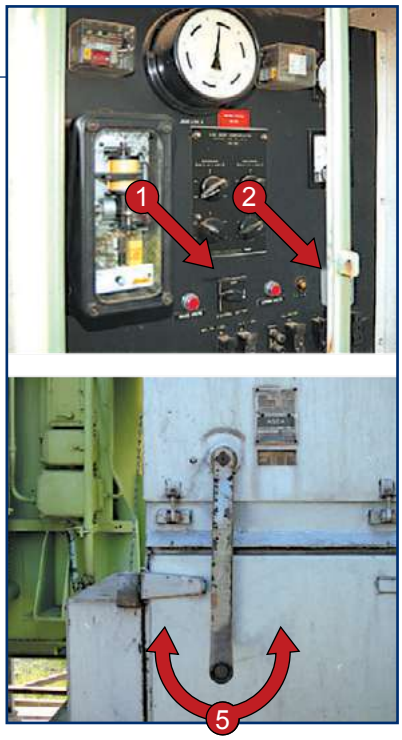
Note: *Confirm the HV by-pass switch is closed prior to opening the regulator HV isolating switches.*

1 Confirm the HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operating handle firmly to the stop position to OPEN both the regulator HV isolating switches simultaneously.

Changing the Regulator Tap - Manually

Note: *The regulator by-pass switch MUST NOT BE CLOSED when manually adjusting taps unless the regulator is out of service.*



1 Rotate the control selector switch to the 'MANUAL' position.

2 Switch the 240V supply to the 'OFF' position.

3 Unscrew and remove the manual tap change operating mechanism access cap.

4 Place the manual tap change operating handle onto the operating mechanism shaft.

5 Rotate the operating handle in the required direction to raise or lower the regulator tap.

6 Remove the operating handle and replace the operating mechanism access cap.

Note:The *word 'POSITION' must be visible in the tap change mechanism viewing window at the completion of the tap change.*

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BRENTFORD LINE REGULATOR

Prior to any operation:

- Ensure the regulator is on the neutral tap (0) prior to closing / opening the by-pass HV fuse.
- Adjusting the regulator tap by more than three (3) tap positions may adversely effect volts.
- This regulator maintains continuous voltage regulation and as a consequence there are no definite tap positions. The neutral indicator light is provided to show when the input and output voltages are equal. This is the regulators neutral tap position (0).

Functions:	Functions: Opening, Closing, Isolation, HV Fuses,Tap Changing - Electric / Manual
Rating:	300 KVA
Insulant:	Oil
Voltage:	22kV

Adjusting the Regulator to neutral Tap – Electrical

Note: *Confirm the neutral position indication light is functioning correctly prior to moving to the neutral tap.*

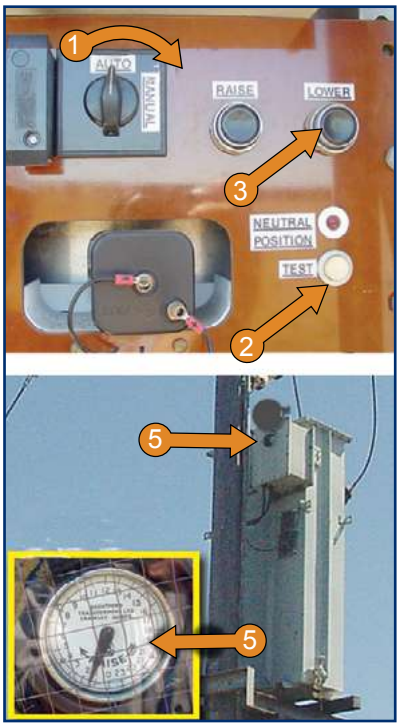
1 Rotate the ‘MANUAL / AUTO’ switch CW to the ‘MANUAL’ position.

2 Confirm the neutral position indicating light and the battery are functioning correctly by pressing the ‘TEST’ button.

3 Press and hold the ‘LOWER’ button until the tap position motor stops running.

4 Confirm the regulator is in the neutral tap position by the illumination of the ‘NEUTRAL POSITION’ indicating light.

5 Confirm the regulator neutral tap position by the mechanical tap position indicator.



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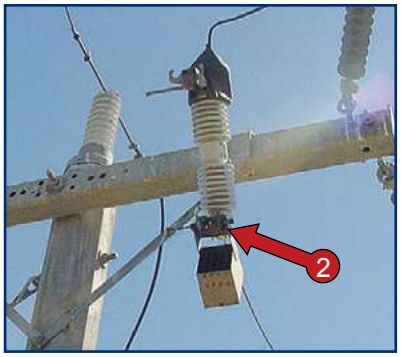
BRENTFORD LINE REGULATOR (CONTINUED)

Closing the Regulator By-pass HV EDO Fuse



- If the 'NEUTRAL POSITION' indicating light is not illuminated do not close the by-pass HV EDO fuse.
- Do not leave the by-pass HV EDO fuse in the open position. Remove and stow the HV EDO fuse.

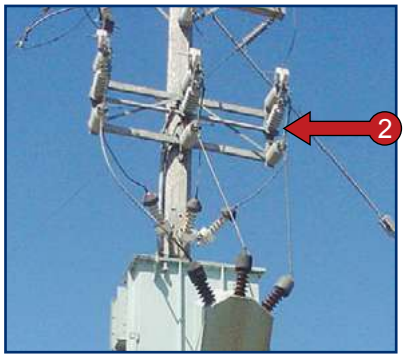
1 Confirm the regulator is on the neutral tap and the LV supply is 'OFF'.

2 Using a HV operating stick place the by-pass HV EDO fuse (65K) into the HV EDO Fuse hinge mechanism.

3 Raise the by-pass HV EDO fuse and **CLOSE** firmly.

Refer to the EDO HV FUSES template in this manual for instruction if required.

Isolating the Regulator



1 Confirm the regulator is on the neutral tap (0) and by-pass HV EDO fuse is closed.

2 **OPEN** the regulator isolating HV switch. These HV switches can vary in make and operating mechanisms. Confirm the HV switch type prior to operation and, if required, refer to the appropriate template in this manual.

3 Confirm the HV isolating switch has opened correctly.

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COOPER REGULATORS CL6 SERIES CONTROL BOX

Functions: Opening, Closing, HV Fuses
Insulant: Oil/Air
Voltage: 22 kV

Prior to any operation:

- Ensure the regulators are on the neutral tap - tap position '0' – and the Auto/Remote toggle switch is in the OFF position, prior to closing the by-pass HV isolators.
- Adjusting the regulator tap in either direction will change output voltage by 200 Volts per tap. When changing taps care should be taken to limit any adverse effect to the output voltage.
- These single phase regulators can be constructed in various combinations e.g.
  - Single unit pole mount
  - Two unit pole mount
  - Two unit ground mount
  - Three unit ground mount (main photograph)
- Check/Confirm Oil levels, Labelling and Semaphore

Adjusting the Regulator to the Neutral Tap

On each regulator unit:

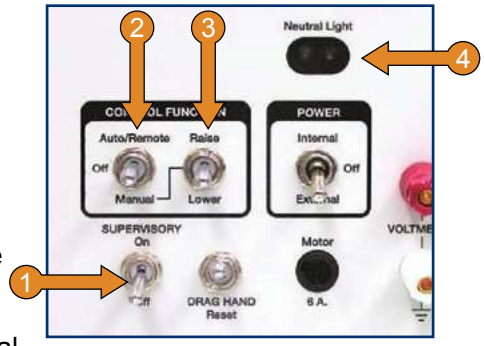
1 Confirm the 'SUPERVISORY' toggle switch is 'Off'

2 Place the 'Auto / Remote' toggle switch in the 'Manual' position as shown.

3 Raise /lower taps using the 'Raise / Lower' toggle switch.

4 The 'Neutral Light' indicator light should illuminate when the regulator is on neutral tap '0'.

5 Confirm the correct neutral tap position '0' on the mechanical tap position indicator.



Note: *Confirm the mechanical tap position indicator points to the neutral tap position '0' on each regulator unit.*

If *the neutral tap position '0' cannot be confirmed by the three methods described - points 5,6 and 9 - then* ***do not proceed*** *any further.*

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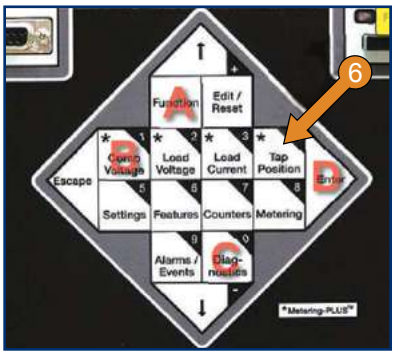
COOPER REGULATORS CL6 SERIES CONTROL BOX (CONTINUED)

6 Press the 'TAP POSITION' keypad '4' and confirm the LCD screen displays Neutral Tap 0.

7 Press 'FUNCTION 11, ENTER' to verify the input voltage on the LCD screen. (ABBD)

8 Press 'FUNCTION 10, ENTER' to verify the output voltage on the LCD screen. (ABCD).

9 If the voltages displayed in steps 7 and 8 are equal then the regulator is on neutral tap.



Closing the Regulator HV By-pass Isolators

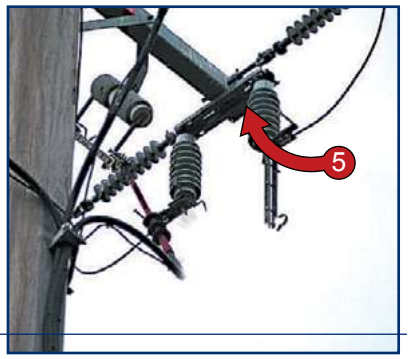
1 Confirm the regulator unit's by-pass HV fuses are closed.

2 Confirm all the regulator units are on neutral tap '0'

3 On each regulator unit place the 'Auto / Remote' toggle switch in the 'Off' position.

4 Turn LV supply to Off.

5 CLOSE the HV by-pass isolators



Isolating the Regulators

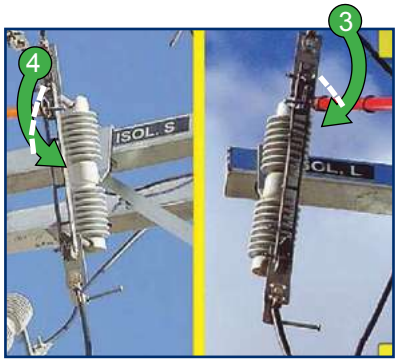
On each regulator unit:

1 Confirm the by-pass isolators and HV fuses are closed.

2 Confirm the 'Auto / Remote' toggle switches are in the 'Off' position, LV supply is 'OFF' and neutral tap.

3 OPEN the regulator unit (1,2,3) L isolator(s).

4 OPEN the regulator unit (1,2,3) S isolator(s).



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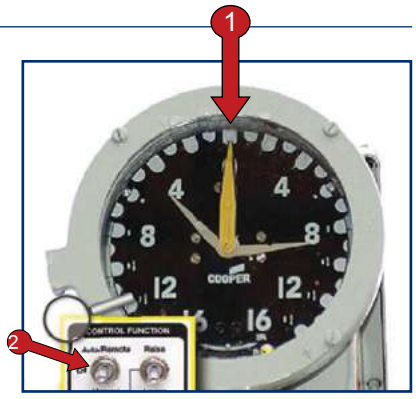
COOPER REGULATORS CL6 SERIES CONTROL BOX (CONTINUED)

Placing the Regulators into Service

Note: *All three methods of neutral tap position 'O' verification must be confirmed prior to placing the regulators into service.*



1 Confirm the mechanical indicators are on tap '0'.

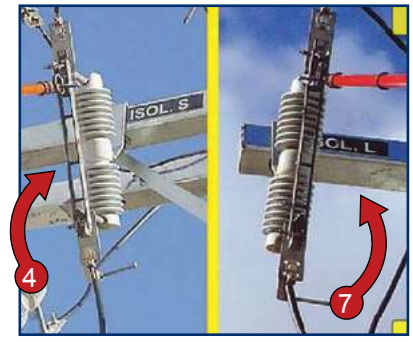
2 Confirm the 'Auto / Remote' toggle switches are in the 'Off position and LV supply is 'OFF'

3 CLOSE the regulator Unit (1,2,3) SL isolator(s) (where fitted).

4 CLOSE the regulator Unit (1,2,3) S isolator(s) as shown

5 Turn on the LV supply

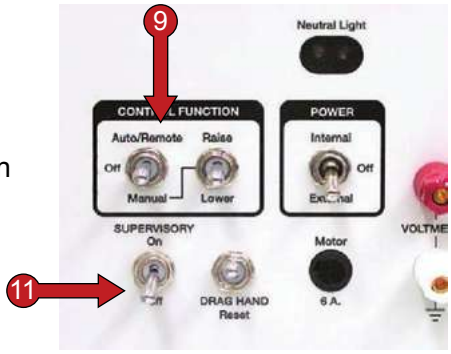
6 Confirm the neutral tap position '0' via the control panel. Refer to the **Adjusting the Regulator to the Neutral Tap** instruction on page 1.



7 When the neutral tap position '0' is confirmed by all three methods, CLOSE the Unit (1,2,3) L isolators as shown.

8 OPEN the regulator by-pass isolators.

9 Confirm each regulator operation by raising / lowering taps as per normal regulator procedure.



10 Place the 'Auto / Remote' toggle switch in the Auto/Remote position and confirm auto operation.

11 Confirm the 'SUPERVISORY' toggle switch is in the position as found prior to switching. (On or Off)

Main Screen Menu Navigation

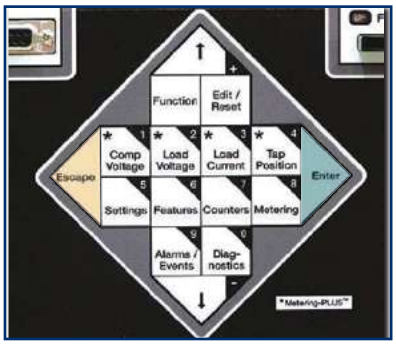
The diamond shaped keypad has three modes of user interface (listed below) with three levels of nested menu structures:

- Numeric Keys
- Short-cut Keys
- Scroll Keys

Enter and Escape Keys

The Enter key is used to enter the menu structure and access the sub menus.

The Escape key is used to step back or exit the sub menus. Repeated pressing of the Escape key will return the display to the Level 1 main menu.



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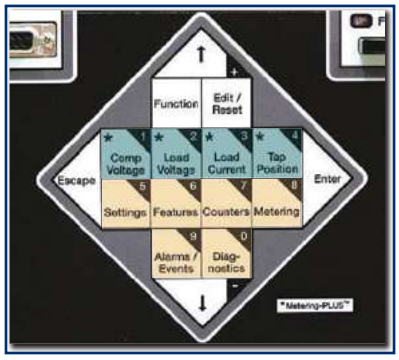
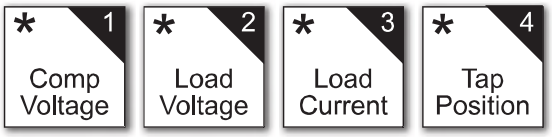
COOPER REGULATORS CL6 SERIES CONTROL BOX (CONTINUED)

Short-cut Key

There are two types of short-cut keys with access to specific locations within the nested menu structure:

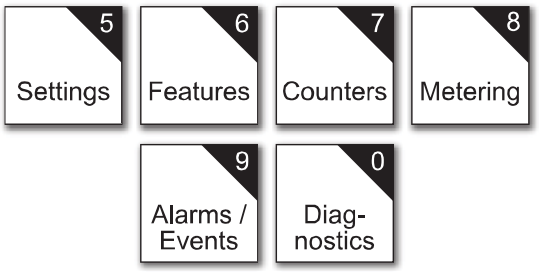


Keys



Provide an instant display of commonly requested diagnostic data as per the key label.

Keys

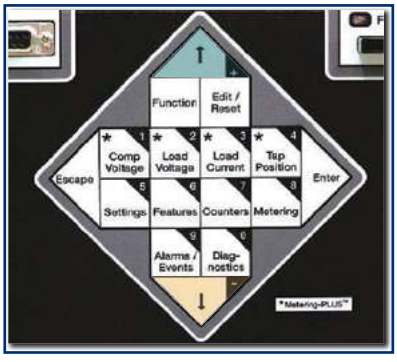


Provide an instant access to level 2 of the level 1 main menu items as per the key label.

Scroll Keys

The ‘UP’ scroll key is used to scroll upwards through the display level 1 main menu or sub menu options. Note: Only four options can be displayed at any one time on the main screen.

The ‘DOWN’ scroll key is used to scroll downwards through the display level 1 main menu or sub menu options. Note: Only four options can be displayed at any one time on the main screen.



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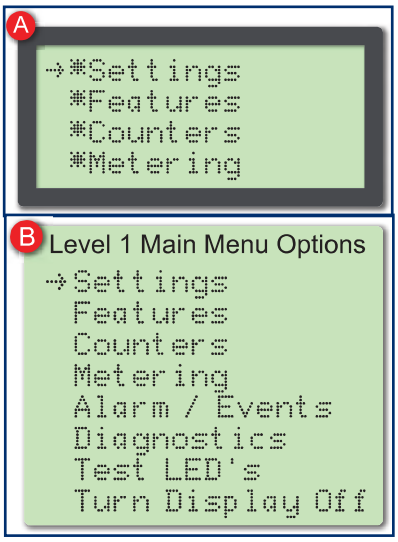
COOPER REGULATORS CL6 SERIES CONTROL BOX (CONTINUED)

Level 1 Main Menu Options list

The default setting for the level 1 main menu is the 'Settings' option - indicated by the arrow as shown A. Use the up and down arrows to scroll through the eight available options B. Note: Only four options can be displayed at any one time. When the desired option is reached press the 'Enter' key to access the sub menu. Press the 'Escape' key to return to the level 1 main menu.



Turning the Main Screen Off

1 Using 'UP' or 'DOWN' keys scroll through to the last option in the level 1 main menu →Turn Display Off

2 Press the 'Enter' key to turn the main screen off.

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COOPER SINGLE PHASE CL-7 VOLTAGE REGULATOR CONTROL

Prior to any operation:

- Confirm the regulators and associated apparatus are fit for service prior to and after any operation
- Warning: Ensure the regulators are on the neutral tap – tap position '0' – prior to closing the Bypass Gas Switch.
- Note: Adjusting the regulator tap by more than three positions in either direction may adversely affect volts.

Functions:	Opening, Closing, Isolation, Tap Change
Rating:	N/A
Insulant:	Oil/Air
Voltage:	22kV

Adjusting Regulator to Neutral Tap

1 Check the tap position on all three regulator units: Press 4 on the Keypad – see A

- To scroll between phases press the forward/back arrow keys B
- Multiphase LEDs 1,2,3 represent R,W,B phases respectively C

If the regulators are more than 6 taps away from neutral, do not proceed any further.

2 Set the regulator to neutral on each phase:

- Place the CONTROL FUNCTION toggle switch in the 'LOCAL MANUAL' position on each phase.

  See D
- Raise/lower taps using the 'RAISE/LOWER' toggle switch on each phase. See E . When raising/lowering taps, DO NOT hold on to the toggle switch as it would result in multiple step changes at once.

VR2 and VR3 refer to W and B phases respectively.

Always keep the tap difference between the phases as small as possible.

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COOPER SINGLE PHASE CL-7 VOLTAGE REGULATOR CONTROL (CONTINUED)

Confirming the regulator neutral tap position

1 To confirm the regulator is on neutral tap (position 0):

- Check the tap position as per Adjusting Regulator to Neutral Tap – Step 1
- Check that the neutral light is illuminated for each phase – see F

2 On each regulator unit:

- Check the mechanical tap position indicator points to the neutral tap position ‘0’.

3 Switch the CONTROL FUNCTION to OFF.

4 Turn LV supply off for each phase by toggling the power switch to OFF.

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COOPER SINGLE PHASE CL-7 VOLTAGE REGULATOR CONTROL (CONTINUED)

Closing the Regulators Bypass Gas Switch

1 Confirm the following:

- CONTROL FUNCTION toggle switches are in the OFF position
- Regulators are on tap ‘0’

2 Close the Bypass Gas Switch.

- Refer to the relevant GAS SWITCH template in this manual if required.

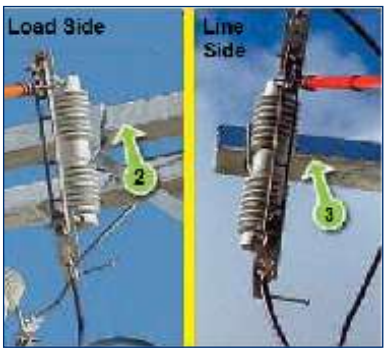
Isolating the Regulators

1 Confirm the following:

- Bypass Gas Switch is closed
- CONTROL FUNCTION toggle switches are in the OFF position
- Regulators are on tap ‘0’

2 Open the load side isolators on each phase.

3 Open the line side isolators on each phase.



Placing the Regulators into service

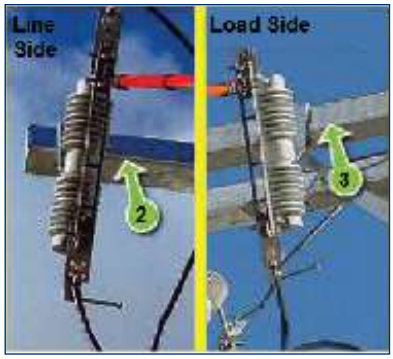
1 Confirm the following:

- Bypass Gas Switch is closed
- CONTROL FUNCTION toggle switches are in the OFF position
- Regulators are on tap ‘0’

2 Close the line side isolators on each phase.

3 Close the load side isolators on each phase.

4 Open the Bypass Gas Switch. Refer to the relevant GAS SWITCH template in this manual if required.



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COOPER SINGLE PHASE CL-7 VOLTAGE REGULATOR CONTROL (CONTINUED)

5 Place the CONTROL FUNCTION toggle switch in the 'AUTO/ REMOTE' position on each phase.

6 Turn LV supply on for each phase by toggling the power switch to INTERNAL.

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COOPER SINGLE PHASE LINE REGULATORS

Prior to any operation:

- Confirm the regulators and associated apparatus are fit for service prior to and after any operation.
- Ensure the regulators are on the neutral tap - tap position ‘0’ - prior to closing the by-pass HV isolators.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely effect volts.

Functions:	Opening, Closing, Isolation, Tap Changing - Electrical
Rating:	Various
Insulant:	Oil/Air
Voltage:	22kV

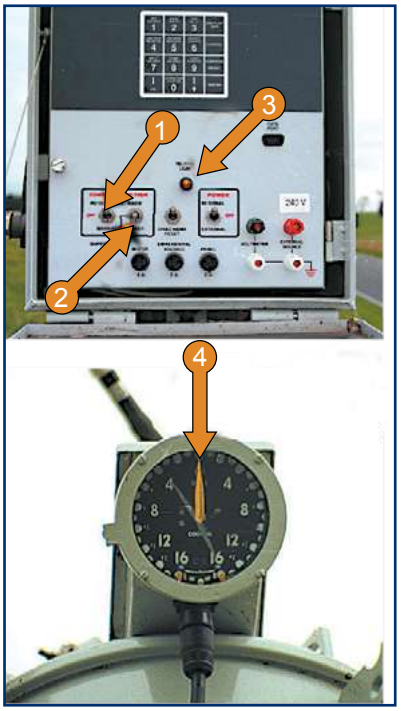
Adjusting the Regulators to Neutral Tap - Electrical

1 Place the Auto / Remote toggle switch in the ‘MANUAL’ position.

2 Raise / lower taps using the ‘RAISE/LOWER’ toggle switch.

3 The indicating light should illuminate when the regulator is on the neutral tap ‘0’.

4 Confirm the correct neutral tap position ‘0’ on the mechanical tap position indicator.



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COOPER SINGLE PHASE LINE REGULATORS (CONTINUED)

Confirming the Neutral Tap Position Via Control Box

Note: *If the neutral tap position '0' cannot be confirmed by the three methods described - points 3,4 and 8 – then do not proceed any further.*

5 Press the 'FUNCTION' key to turn on the LV control panel display.

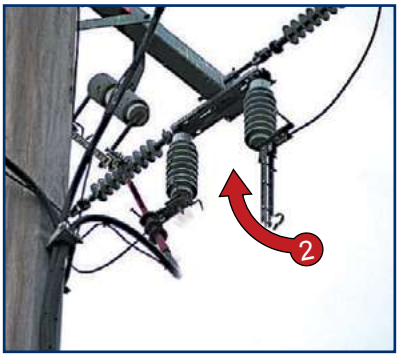
6 Press 'FUNCTION 1,1, ENTER' to verify the input voltage.

7 Press 'FUNCTION 1,0, ENTER' to verify the output voltage.

8 If the voltages displayed in steps 2 and 3 are equal then the regulator is on the neutral tap.

9 Press the 'DISPLAY OFF' key.

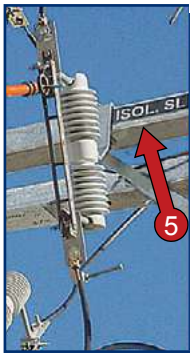
Closing the Regulator HV By-pass Isolator



1 Confirm the regulators are on the neutral tap '0' and the LV supplies are OFF.

2 **CLOSE** the HV by-pass Isolators.

Isolating the Regulators



On each regulator in turn - Unit 1 and Unit 2.

1 Confirm the by-pass isolators are closed.

2 Confirm the Auto / Remote toggle switches are in the 'MANUAL' position with the regulators on tap '0' via the indicating lights.

3 **OPEN** the Unit 1 / Unit 2 L isolator.

4 **OPEN** the Unit 1 / Unit 2 S isolator.

5 **OPEN** the Unit 1 / Unit 2 SL isolator.

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COOPER SINGLE PHASE LINE REGULATORS (CONTINUED)

Placing the Regulators Into Service

Note: *All three methods of neutral tap position '0' verification must be confirmed prior to placing the regulators into service.*

On each regulator in turn - Unit 1 and Unit 2.

1 Confirm the mechanical indicators are on tap '0'.

2 Confirm the Auto / Remote toggle switches are in the 'MANUAL' position.

3 **CLOSE** the Unit 1 / Unit 2 SL isolator.

4 **CLOSE** the Unit 1 / Unit 2 L isolator.

5 Confirm the regulators are on the neutral tap '0' via the indicating lights in the control boxes.

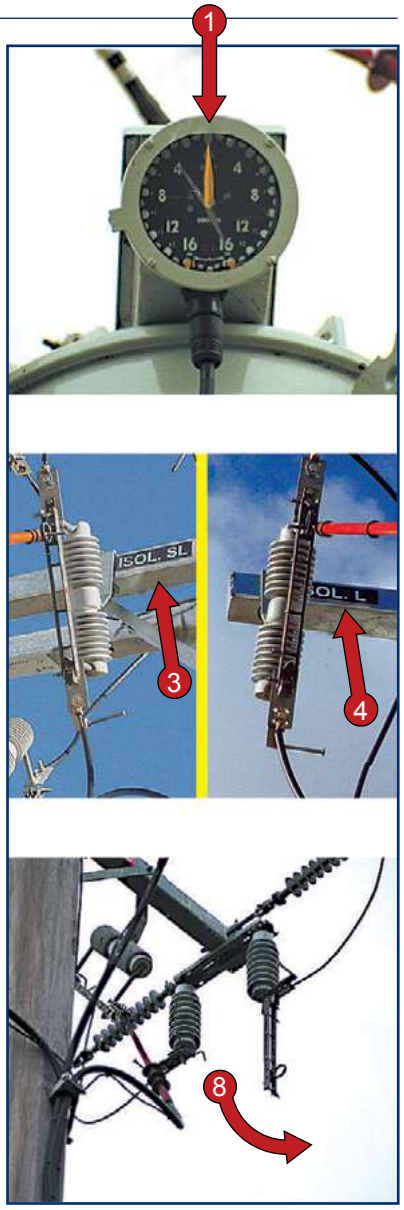
6 Confirm the neutral tap positions '0' via the control panel. Refer to the 'Confirming Neutral Tap Position Via Control Box' instruction on the previous page.

7 When the neutral tap position '0' is confirmed by all three options as described, close the Unit 1 / Unit 2 S isolators.

8 **OPEN** the regulator by-pass isolators.

9 Restore the LV supply to normal and place the regulators in Auto Control.

10 Confirm each regulator operation by raising / lowering taps as per normal regulator procedure.



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CROMPTON GREAVES FG/2/33/200 LINE REGULATOR

Prior to any operation:

- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely effect volts.
- The 'CONTROL SELECTOR' and 'LOCAL CONTROL' switches are found on the outside of the control box cabinet on this regulator.
- The regulator neutral tap position number is shown on the sign adjacent to the by-pass switch operating handle.

Functions: Opening, Closing, Isolation, Tap Changing - Electrical
Rating: 5 Kva
Insulant: Oil/Air

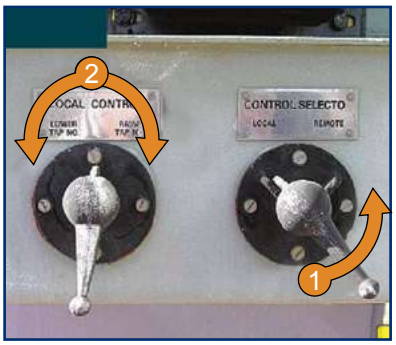
Adjusting the Regulator to Neutral Tap - Electrical

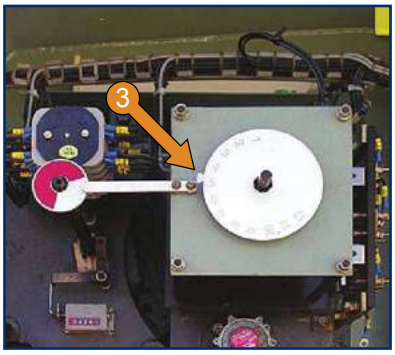
1 Rotate the control selector switch **ACW** to the 'LOCAL' position as shown.

2 Rotate the 'LOCAL CONTROL' switch **CW** to raise the tap number, **ACW** to lower the tap number until the neutral tap is reached.

3 Confirm the correct neutral tap position on the mechanical tap position indicator.

4 Ensure the mechanical tap position indicator points to the neutral tap position.





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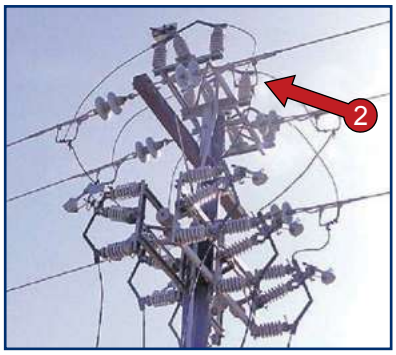
CROMPTON GREAVES FG/2/33/200 LINE REGULATOR (CONTINUED)

Closing the Regulator HV By-pass Switch

1 Confirm the regulator is on the neutral tap and the LV supply is 'OFF'.

2 **CLOSE** the HV by-pass switch.

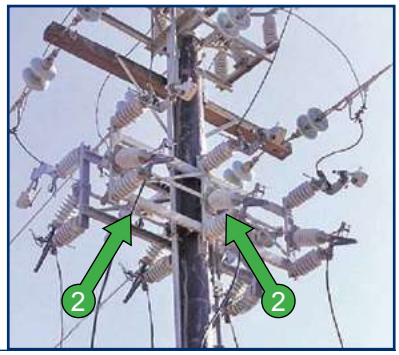
Note: *By-pass switches may vary in make and type. Refer to appropriate sections of this manual for operating instructions if required.*



Opening the Regulator HV Isolating Switches

1 Confirm the HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operating handle firmly to the stop position to **OPEN** both the regulator HV isolating switches simultaneously.



Changing the Regulator Tap - Manually

1 Rotate the control selector switch **ACW** to the 'LOCAL' position.

2 Rotate the 240V supply switch **CW** to the 'OFF' position..

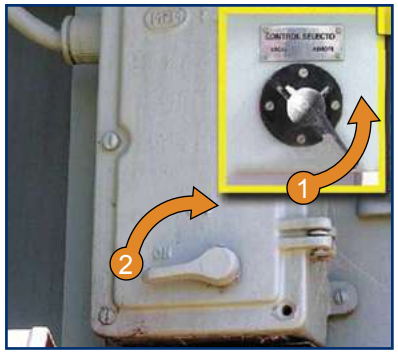
3 Place the manual tap change operating handle onto the operating mechanism as shown.

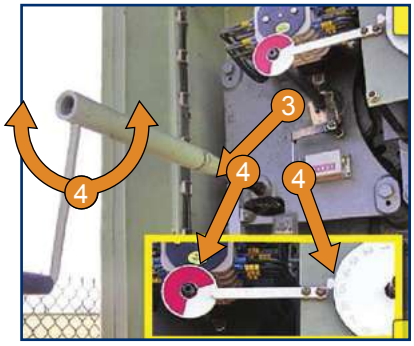
4 Rotate the operating handle in the required direction to raise or lower the regulator tap until the tap position indicates the required tap position. This is correct when the indicator points to both the required tap number and the silver segment of the indication disk as shown.

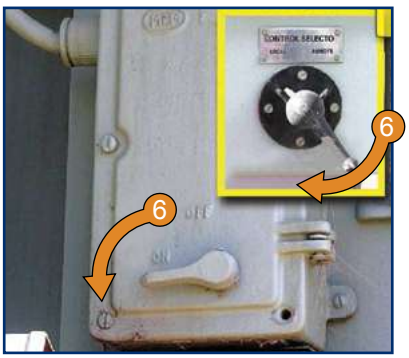
Caution: *Confirm the tap position at the completion of the manual tap change operation.*

5 Remove the operating handle.

6 If required rotate the control selector switch **CW** to the 'REMOTE' position and the 240V supply switch **ACW** to the 'ON' position.







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CROMPTON PARKINSON POLE MOUNTED REGULATOR

Prior to any operation:

- Ensure the regulator is on the neutral tap-tap position 1 – prior to closing the by-pass HV EDO fuse.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely affect volts

Functions:	Opening, Closing, Isolation, Tap Changing - Electrical
Insulant:	Oil
Voltage:	22kV

Adjusting the Regulator to Neutral Tap – Electrical

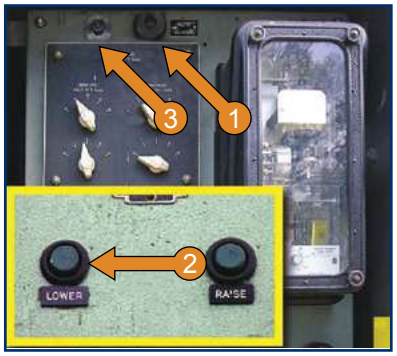
1 Move the 'AUTO/MANUAL' switch to the 'MANUAL' position.

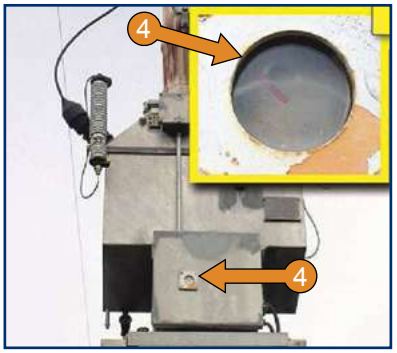
2 Press the 'LOWER' button to move the regulator tap to the neutral tap position – tap position 1.

3 Confirm the regulator is on the neutral tap position via the indicating light.

Note: *If the indicating light has not illuminated, check the condition of the globe and replace if required.*

4 Confirm the regulator is on the neutral tap position via the mechanical indicator as shown.





CROMPTON PARKINSON POLE MOUNTED REGULATOR

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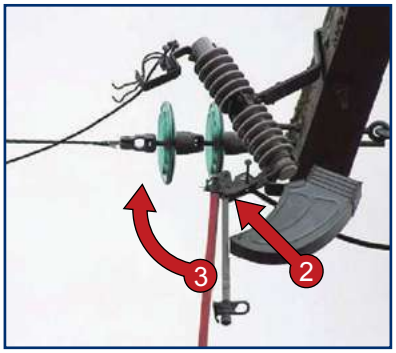
CROMPTON PARKINSON POLE MOUNTED REGULATOR (CONTINUED)

Closing the Regulator By-pass HV EDO Fuse

1 Confirm the regulator is on the neutral tap (1)

2 Using an HV operating stick, place the by-pass HV EDO fuse into the HV EDO fuse hinge mechanism.

3 **CLOSE** the by-pass HV EDO fuse in a firm and positive manner.



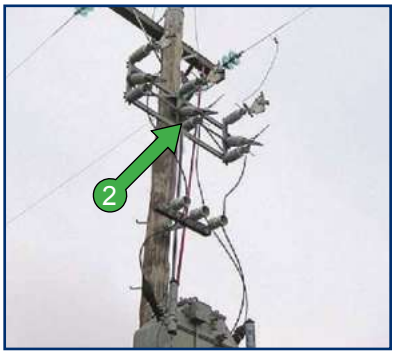
Note: *Do not leave the by-pass HV EDO fuse in the open position – remove and store in a weather proof location.*

Isolating the Regulator

1 Confirm the regulator is on the neutral tap position – tap position 1, and the HV EDO by-pass fuse is closed.

2 **OPEN** the regulator HV isolating switch.

3 Confirm the HV switch has opened correctly.



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GE SINGLE PHASE VOLTAGE REGULATORS

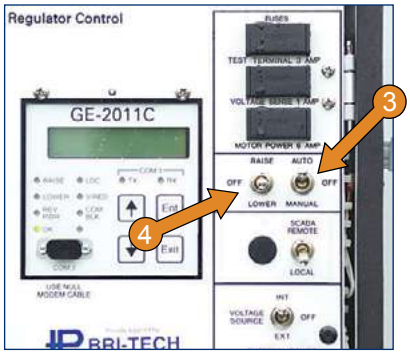
Prior to any operation:

- Confirm the regulators and associated apparatus are fit for service prior to entering and after exiting the regulator enclosure.
- The neutral tap position for this regulator is ‘0’.
- Warning: Ensure the regulators are on the neutral tap - tap position ‘0’ - prior to operating the by-pass gas switch.
- Note adjusting the regulator tap by more than six (6) positions in either direction may adversely affect volts.
- Press the ‘Ent’ key to turn on the control panel display - Press the ‘Exit’ key to exit the display.
- Check and confirm oil levels, labeling and semaphores

MODEL:	GE-2011C VOLTAGE REGULATOR CONTROL
Functions:	Opening, Closing, Isolation, Tap Changing - Electrical
Insulant:	Oil/Air
Voltage:	22kV

Adjusting the Regulator to the Neutral Tap

1 Confirm the tap position on all three regulator units. If the regulators are more than 6 taps off neutral refer to Network Controller for instruction.



ON EACH REGULATOR UNIT

2 Open the regulator unit access door.

3 Place the AUTO/MANUAL’ toggle switch in the ‘MANUAL’ position.

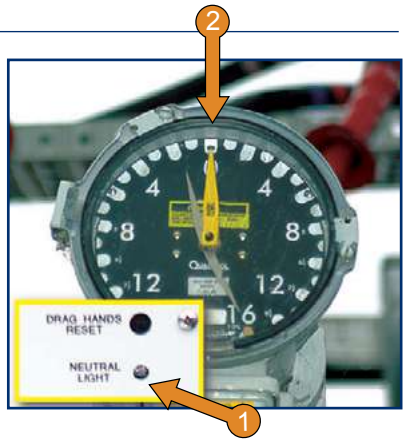
4 Raise/lower taps using the ‘RAISE/LOWER’ toggle switch. Hold the toggle switch in the ‘RAISE’ or ‘LOWER’ position for approx. 5 seconds to change the tap position.

Confirming the Regulator Neutral Tap Position

ON EACH REGULATOR UNIT

1 Confirm the ‘Neutral Light’ indicator LED has illuminated when the regulator is on the neutral tap ‘0’.

2 Confirm the correct neutral tap position ‘0’ on the mechanical tap position.



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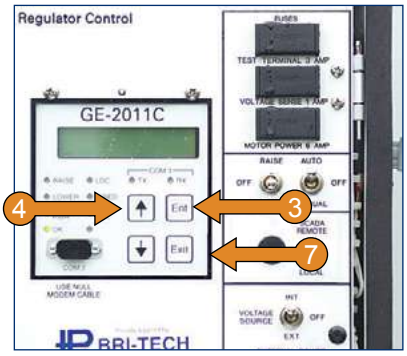
GE SINGLE PHASE VOLTAGE REGULATORS (CONTINUED)

Confirming the Regulator Neutral Tap Position – continued



3 Press the 'Ent' key to turn on the panel display.

4 Press the arrow ↑ to scroll to 'SOURCE VOLTAGE' (the input voltage - note the value).

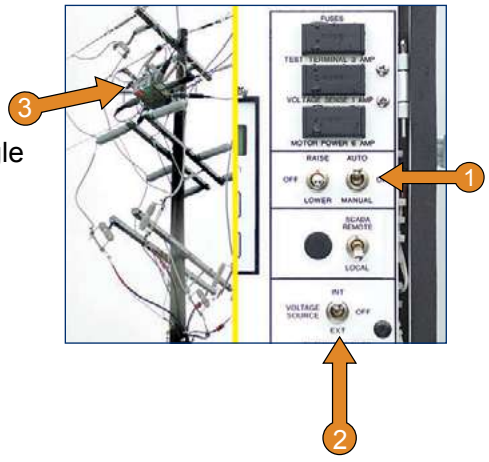
5 Continue pressing the arrow ↑ to scroll to 'COMP VOLTAGE' (The output voltage - note the value). Both these values are given in low volts and should be almost identical.

6 Continue pressing the ↑ arrow to scroll to 'TAP POSITION' – 'NEUTRAL POSITION' will be displayed.

7 Press the 'Exit' key to turn off the display.

Note: *If the neutral tap position '0' cannot be confirmed by the three methods described - Neutral light, mechanical indicator and display values - DO NOT PROCEED ANY FURTHER.*

Closing the Regulators Bypass Gas Switch



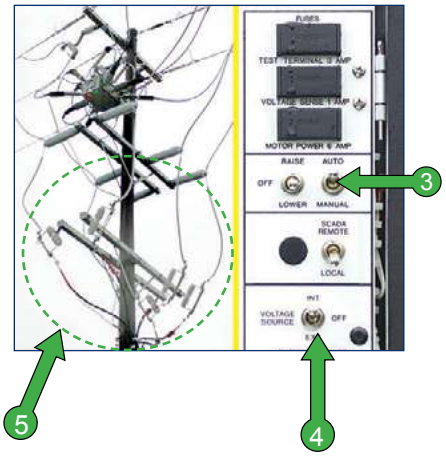
1 Confirm each regulator unit is on the neutral tap '0' then immediately place the 'AUTO / MANUAL' toggle switch on each regulator unit in the 'OFF' position.

2 On each regulator unit place the 'VOLTAGE SOURCE' toggle switch in the 'OFF' position.

3 Close the bypass gas switch. Refer to the relevant GAS SWITCH template in this manual if required.

Note: *All three methods of neutral tap position '0' verification must be confirmed prior to closing the bypass gas switch.*

Isolating the Regulator Units



1 Confirm the regulator units bypass gas switch is closed.

2 Confirm all the regulator units are on the neutral tap '0'.

3 On each regulator unit confirm the 'AUTO / MANUAL' toggle switch is in the 'OFF' position.

4 On each regulator unit confirm the 'VOLTAGE SOURCE' toggle switch is in the 'OFF' position.

5 Open the Line and Load side isolators.

Note: *All three methods of neutral tap position '0' verification must be confirmed prior to isolating the regulators into service.*

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GE SINGLE PHASE VOLTAGE REGULATORS (CONTINUED)

Placing the Regulators into Service

1 Confirm the regulator units bypass gas switch is closed.

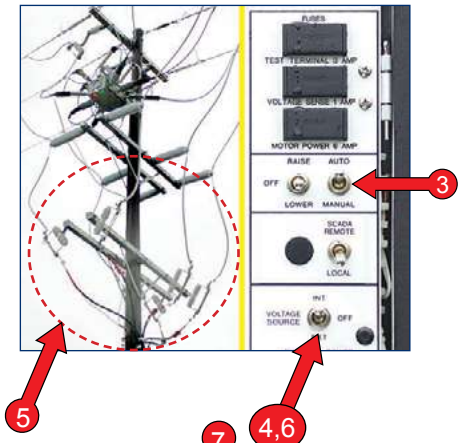
2 Confirm all the regulator units are on the neutral tap ‘0’.

3 On each regulator unit confirm the ‘AUTO / MANUAL’ toggle switch is in the ‘OFF’ position.

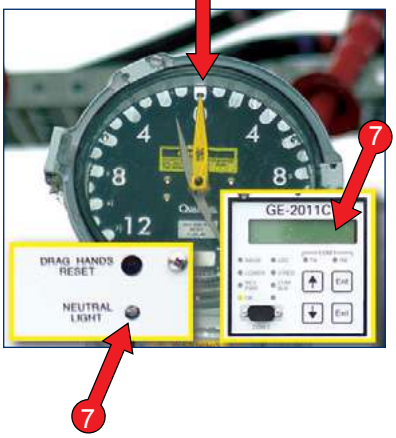
4 On each regulator unit confirm the ‘VOLTAGE SOURCE’ toggle switch is in the ‘OFF’ position.

5 Close the Line and Load side isolators as shown.

6 On each regulator unit place the ‘VOLTAGE SOURCE’ toggle switch in the ‘INT’ position.



7 Reconfirm the regulator units are on the neutral tap ‘0’ via the three verification options, neutral light, mechanical indicator and display values; otherwise NO NOT PROCEED.

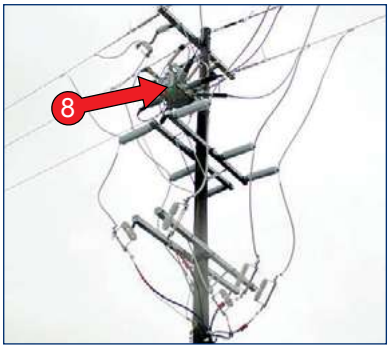


8 Open the bypass GAS SWITCH template in this manual if required.

9 On each regulator unit place the ‘AUT/MANUAL’ toggle switch in the ‘AUTO’ position.

10 Press Exit key to turn off panel.

11 Close the regulator control unit access doors.



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MCGRAW EDISON SINGLE PHASE: LINE REGULATOR

Prior to any operation:

- Ensure regulator is on neutral tap ‘0’ prior to closing by-pass HV isolator.

Functions:	Opening, Closing, Isolation, Tap Changing - Electrical
Rating:	Various
Insulant:	Oil/Air
Voltage:	22kV

Adjusting Regulator to Neutral Tap - Electrically

1 Place the Auto/Remote toggle switch to the ‘MANUAL’ position.

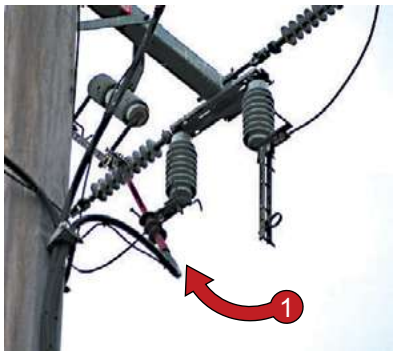
2 Raise/lower taps using the ‘RAISE/LOWER’ toggle switch.

3 Indicating light should illuminate when regulator is on neutral tap ‘0’.

4 Confirm correct neutral tap position ‘0’ on the mechanical tap position indicator.

Closing Regulator HV By-pass Isolator

1 After confirming regulator is on neutral tap **CLOSE** HV by-pass isolator.



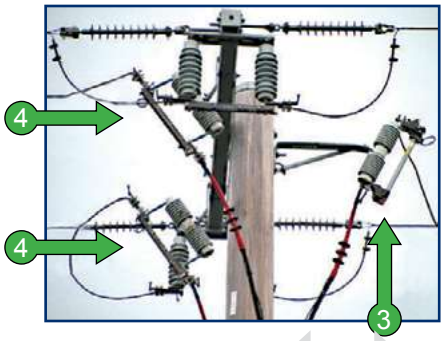
Isolating Regulator

1 Confirm by-pass isolator is closed.

2 Confirm the Auto/Remote toggle switch is in the ‘MANUAL’ position with regulator on tap ‘0’.

3 **OPEN** the load side HV fuse.

4 **OPEN** two (2) supply side isolators.



MCGRAW EDISON SINGLE PHASE: LINE REGULATOR

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METROPOLITAN VICKERS LSA 3 REGULATOR

Prior to any operation:

- The neutral tap position for this regulator is tap position '11'. This regulator can only boost the output voltage.
- Adjusting the regulator tap in either direction by more than three (3) positions in either direction may adversely effect volts.
-

Functions:	Opening, Closing, Isolation, Tap Changing - Electrical
Rating:	2000 Kva
Insulant:	Oil/ Air/ SF6
Voltage:	22 kV

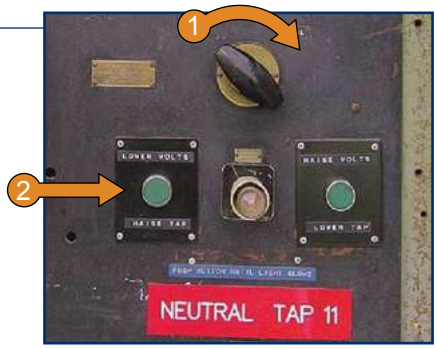
Adjusting the Regulator to Neutral Tap

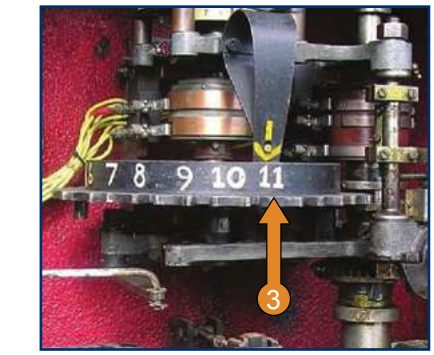
1 Rotate the control selector switch **CW** to the 'MANUAL' position.

2 Press the 'RAISE TAP' (Lower Volts) button until the mechanical tap position indicator points to the tap position 11 - neutral tap.

3 Confirm the correct neutral tap position '11' on the mechanical tap position indicator as shown.

4 Switch 'OFF' the LV supply if operating the HV by-pass switch.





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METROPOLITAN VICKERS LSA 3 REGULATOR (CONTINUED)

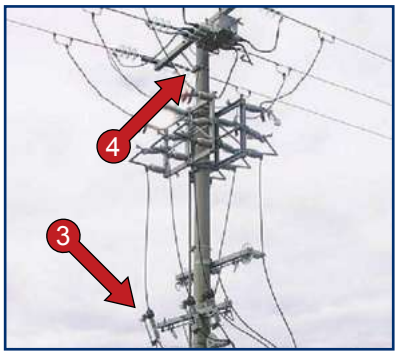
Closing the Regulator HV By-pass Switch

1 Confirm the regulator is in the neutral tap - 11.

2 Confirm the LV Supply switch is 'OFF'.

3 Confirm the boric acid HV by-pass fuses are closed.

4 **CLOSE** the HV by-pass switch.



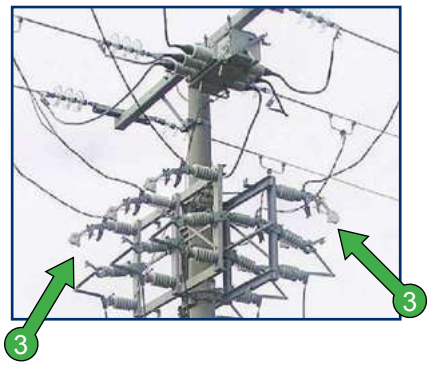
Opening the Regulator HV Isolating Switches

1 Confirm the regulator HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operating handle firmly to the stop position to **OPEN** both the HV isolating switches simultaneously as shown.

3 Visually confirm both regulator isolating switches have opened correctly as shown.

Note: *HV isolating switches may vary in make and type. Refer to the appropriate sections of this manual for operating instructions if required.*



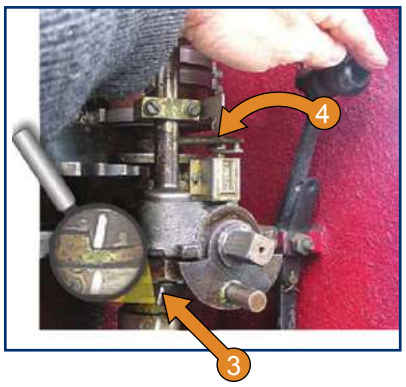
Disengaging the Tap Change Drive Coupling

1 Confirm the control; selector switch is in the 'MANUAL' position.

2 Confirm the LV Supply switch is 'OFF'.

3 Place alignment marks on the drive coupling upper and lower sections as shown.

4 Shift the drive coupling disengagement handle **to the left** to the stop position.



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METROPOLITAN VICKERS LSA 3 REGULATOR (CONTINUED)

Lowering the Regulator Tap – Manually

1 Rotate the over-travel stop plate 180 degrees ACW from the lower position **A** to the upper position **B** as shown.

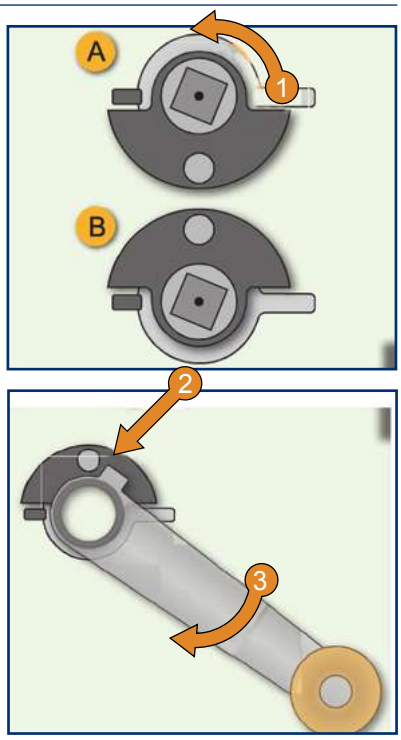
2 Insert the operating handle onto the over-travel stop plate so the drive pin is on the **CW** side of the stop pin as shown.

3 Rotate the operating handle **CW** to the stop position to lower the tap position one step.

4 Remove the operating handle.

5 Repeat instructions **1 to 4** for each lowering tap step.

Note: *Confirm the tap position via the mechanical tap position indicator at the completion of the required tap change.*



Raising the Regulator Tap Manually.

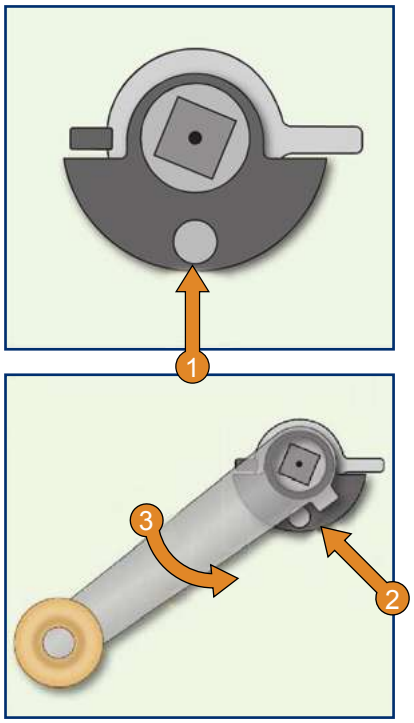
1 Confirm the over-travel stop plate is in the lowered position as shown.

2 Insert the operating handle onto the over-travel stop plate so the drive pin is on the **ACW** side of the stop pin as shown.

3 Rotate the operating handle **ACW** to the stop position to raise the tap position one step.

4 Remove the operating handle.

5 Repeat instructions **1 to 4** for each raising tap step.



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METROPOLITAN VICKERS LSA 3 REGULATOR (CONTINUED)

Re-engaging the Tap Change Drive Coupling

1 Insert the operating handle onto the drive shaft as shown.

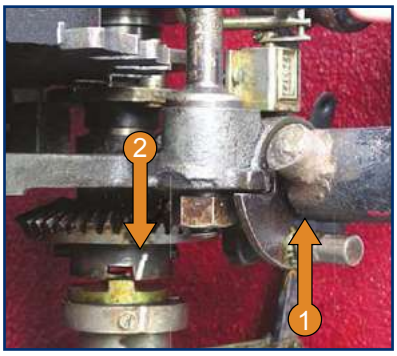
2 Rotate the operating handle slightly until the upper and lower drive couplings align with the previously placed alignment marks as shown.

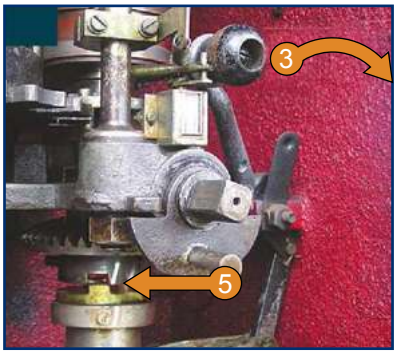
3 Shift the drive coupling disengagement handle **to the right** to the stop position.

4 Remove the operating handle.

5 Confirm the drive upper and lower couplings have engaged correctly - alignment marks match.

Note: *Ensure the previously placed alignment marks match before re-engaging the drive coupling.*





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TMC SWER REGULATOR

Prior to any operation:

- Confirm the regulator and associated apparatus are fit for service prior to and after any operation.
- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely affect volt.
- The regulator by-pass HV fuse is not to be left hanging open for extended periods of time. This will prevent water ingress into the fuse tube.

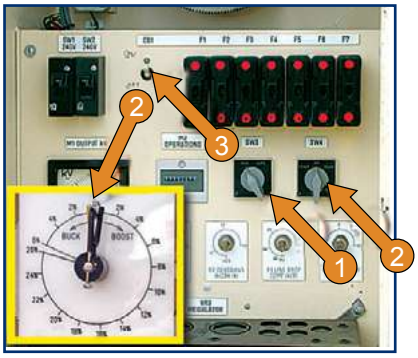
Functions:	Opening, Closing, Isolation, Tap Changing - Electric / Manual
Rating:	100KVA
Insulant:	Oil
Voltage:	12.7kV

Adjusting the Regulator to Neutral Tap - Electrical

1 Move the ‘MANUAL / AUTO’ switch to the ‘MANUAL’ position.

2 Move the ‘LOWER / OFF / RAISE’ switch to the ‘LOWER’ or ‘RAISE’ position until the regulator tap position indicator points to ‘0%’.

3 Switch the LV CB 1 to the ‘OFF’ position.

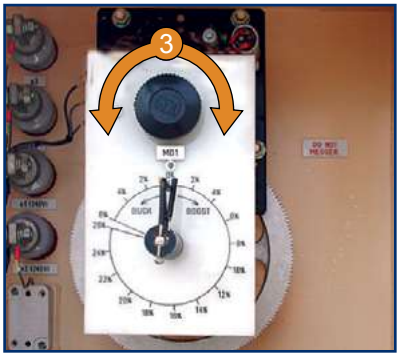


Adjusting the Regulator to Neutral Tap - Manual

1 Move the ‘MANUAL / AUTO’ switch to the ‘MANUAL’ position.

2 Switch the LV CB 1 to the ‘OFF’ position.

3 Rotate the regulator tap position manual control knob CW / ACW until the tap indicator points to ‘0%’.



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TMC SWER REGULATOR (CONTINUED)

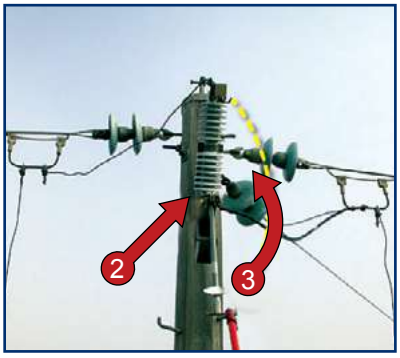
Closing the Regulator By-pass HV EDO Fuse

1 Ensure the regulator is on the neutral tap (0%).

2 Using a HV operating stick place the by-pass HV fuse into the HV EDO Fuse hinge mechanism.

3 Raise the by-pass HV EDO fuse and **CLOSE** firmly.

4 Refer to the EDO HV FUSES template in this manual for instructions if required.

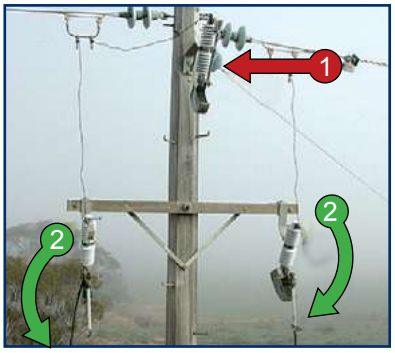


Isolating the Regulator

1 Confirm the regulator is on the neutral tap (0%) and the by-pass HV EDO fuse is closed.

2 **OPEN** the regulator line and load side fuses.

3 Remove the HV fuses if required.



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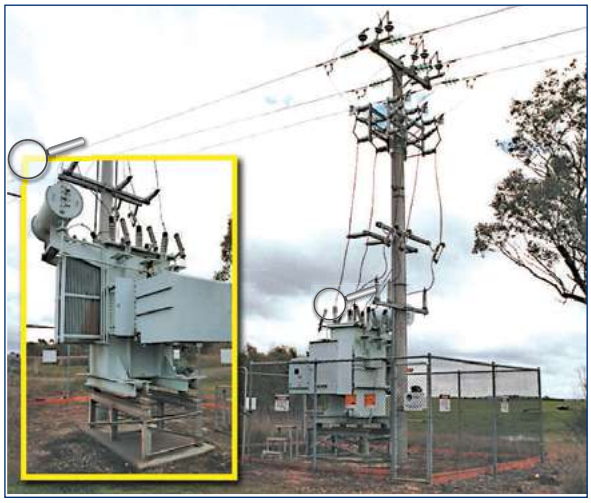
TYREE LINE REGULATOR

Functions:	Opening, Closing, Isolation, Tap Changing - Electric / Manual
Rating:	Various
Insulant:	Oil/Air
Voltage:	22kV

Prior to any operations:

- Confirm the regulator and associated apparatus are fit for service prior to and after any operation.
- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely affect volts.
- The regulator neutral tap position number is shown on the sign adjacent to the by-pass switch operating handle.

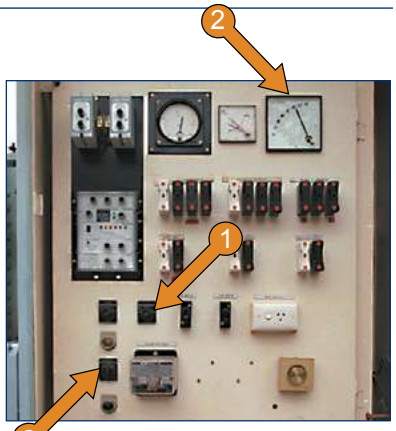


Adjusting the Regulator to Neutral Tap – Electrical

1 Rotate the control selector switch to the ‘MANUAL’ position.

2 Raise / lower the regulator tap via the operations selector switch until the tap indicator points to the neutral tap position.

3 Confirm the correct neutral position on the mechanical tap position indicator.



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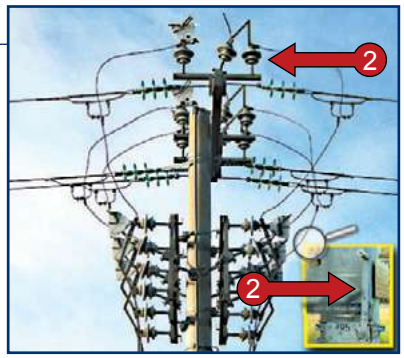
TYREE LINE REGULATOR (CONTINUED)

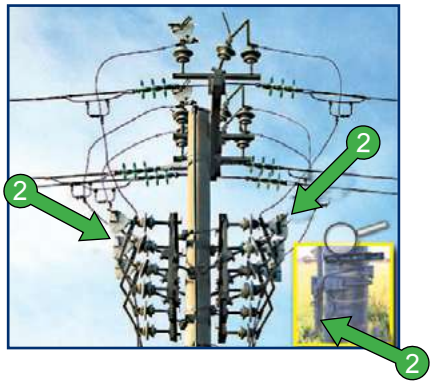
Closing the Regulator HV By-pass Switch



1 Confirm the regulator is on the neutral tap and the LV supply is 'OFF'.

2 **CLOSE** the HV by-pass switch.

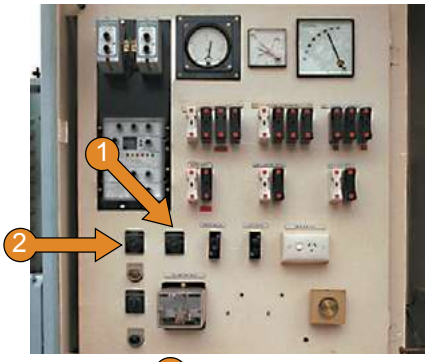
Opening the Regulator HV Isolating Switches

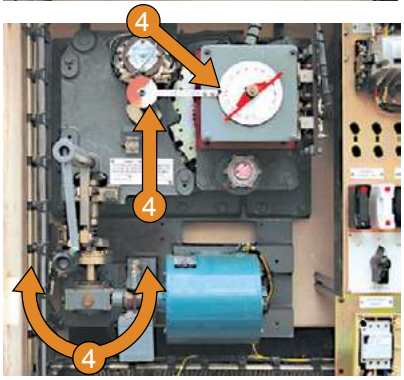


1 Confirm the HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operatinghandle firmly to the stop position to **OPEN** both the regulator HV isolating switches simultaneously.

Changing the Regulator Tap – Manually





1 Rotate the control selector switch to the 'MANUAL' position.

2 Rotate the Isolator selector switch to the 'OFF' position (240 Volt supply)

Note: *Confirm the correct tap position via the mechanical tap position indicator.*

3 Open the tap changer control mechanism access door and place the manual tap change operating handle onto the tap change mechanism shaft.

4 Rotate the operating handle in the required direction until the tap position indicator moves to the required tap position and the indicator points to the white segment on the indicator disk.

5 Remove the operating handle and close the access door.

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WILSON FERRANTI LINE REGULATOR

Prior to any operation:

- Confirm the regulator and associated apparatus are fit for service prior to and after any operation.
- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely effect volts.
- This regulator has two (2) versions of the tap changer control box. Both are shown below.

Functions:	Opening, Closing, Isolation, Tap Changing - Electric / Manual
Rating:	Various
Insulant:	Oil/Air
Voltage:	22kV

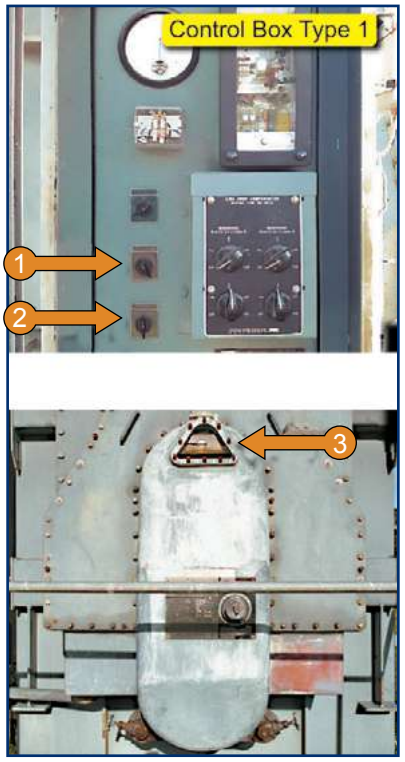
Adjusting the Regulator to Neutral Tap - Electrical (Control Box Type 1)

Note: *The regulator neutral tap position number is shown on the sign adjacent to the by-pass switch operating handle.*

1 Rotate the control selector switch to the ‘MANUAL’ position.

2 Raise / lower the regulator tap via the operations selector switch until the tap indicator points to the neutral tap position.

3 Confirm the correct neutral tap position on the mechanical tap position indicator.



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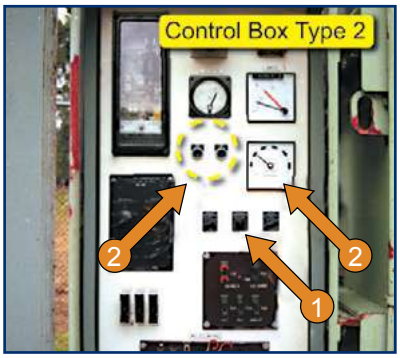
WILSON FERRANTI LINE REGULATOR (CONTINUED)

Adjusting the Regulator to Neutral Tap - Electrical (Control Box Type 2)

1 Rotate the control selector switch to the 'MANUAL' position.

2 Raise / lower the regulator tap via the voltage control 'RAISE / LOWER' push buttons until the tap indicator points to the neutral tap position.

3 Confirm the correct neutral tap position on the mechanical tap position indicator.

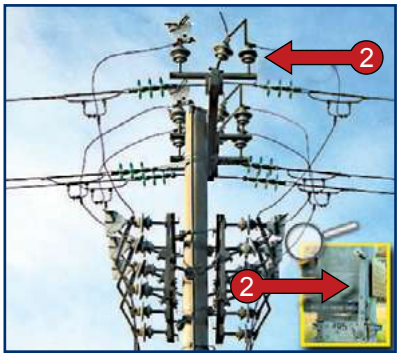


Closing the Regulator HV By-pass Switch

1 Confirm the regulator is on the neutral tap and the LV supply is 'OFF'.

2 CLOSE the HV by-pass switch.

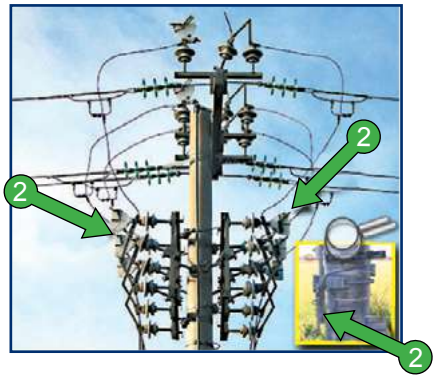
Note: *By-pass switches may vary in make and type. Refer to the appropriate templates*



Opening the Regulator HV Isolating Switches

1 Confirm the HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operating handle firmly to the stop position to OPEN both the regulator HV isolating switches simultaneously.



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WILSON FERRANTI LINE REGULATOR (CONTINUED)

Changing the Regulator Tap - Manually

1 Rotate the control selector switch to the ‘MANUAL’ position.

2 Rotate the 240 Volt supply selector switch to the ‘OFF’ position.

3 Unscrew and remove the manual tap change operating mechanism access cap.

4 Insert the manual tap change operating handle into the operating mechanism firmly against the spring resistance and tighten the knurled locating knob.

5 Rotate the operating handle in the required direction to raise or lower the regulator tap.

6 When the tap change is completed continue to rotate the operating handle for 2.5 turns in same direction.

7 Remove the operating handle and ensure the tap change operating mechanism pops out before replacing the access cap.

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WILSON FULLER REGULATOR

Prior to any operation:

- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Adjusting the regulator tap by more than three (3) positions in either direction may adversely effect volts.

Functions:	Opening, Closing, Trans Switch/ CB, Earthing, HV Fuses
Rating:	Various
Insulant:	Oil/ Air
Voltage:	22 kV

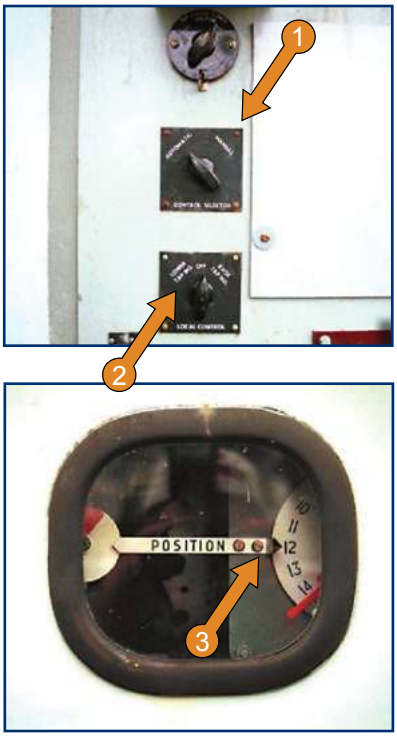
Adjusting the Regulator to Neutral Tap– Electrical

1 Rotate the control selector switch to the ‘MANUAL’ position.

2 Raise / lower the regulator tap via the operations selector switch until the tap indicator points to the neutral tap position.

3 Confirm the correct neutral tap position on the mechanical tap position indicator.

Note: *The regulator neutral tap position number is shown on the sign adjacent to the by-pass switch operating handle.*



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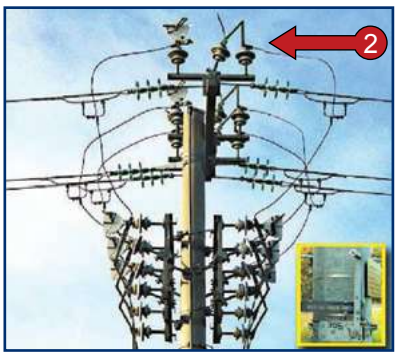
WILSON FULLER REGULATOR (CONTINUED)

Closing the Regulator HV By-pass Switch

1 Confirm the regulator is on the neutral tap and the LV supply is 'OFF'.

2 **CLOSE** the HV by-pass switch.

Note: *By-pass switches may vary in make and type. Refer to appropriate sections of this manual for operating instructions if required.*

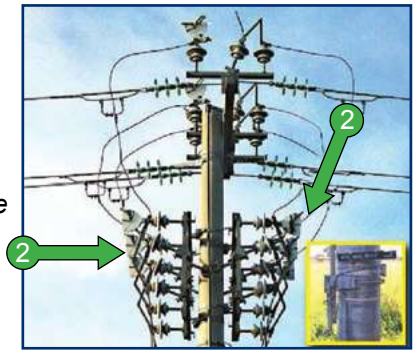


Opening the Regulator HV Isolating Switches

1 Confirm the HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operating handle firmly to the stop position to **OPEN** both the regulator HV isolating switches simultaneously.

Note: *Isolating switches may vary in make and type. Refer to appropriate sections of this manual for operating instructions if required.*



Changing the Regulator Tap – Manually

1 Rotate the control selector switch to the 'MANUAL' position.

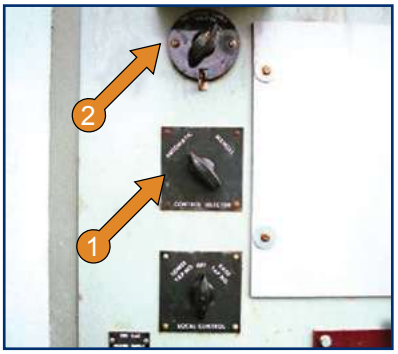
2 Rotate the Isolator selector switch to the 'OFF' position.

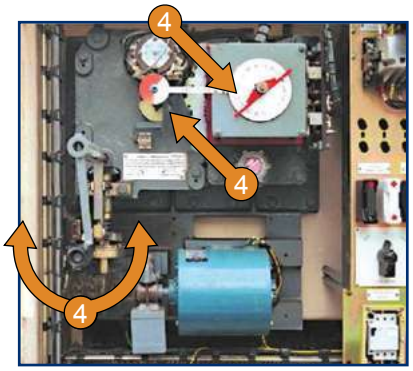
3 Open the tap changer control mechanism access door and place the manual tap change operating handle onto the tap change mechanism shaft.

4 Rotate the operating handle in the required direction until the tap position indicator moves to the required tap position and the indicator points to the white segment on the indicator disk.

5 Remove the operating handle and close the access door.

Note: *The regulator by-pass switch MUST NOT BE CLOSED when manually adjusting taps unless the regulator is out of service.*





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WILSON LINE REGULATOR

Prior to any operation:

- The regulator supervisory control must be placed in the 'LOCAL' position prior to any local operation.
- Ensure the regulator is on the neutral tap prior to closing the HV by-pass switch.
- Check/confirm oil levels, labeling and semaphores.

Notes: *Adjusting the regulator tap by more than three (3) positions in either direction may adversely effect volts.*

This regulator has an external switch for 'off load' change over from neutral tap '5' to neutral tap '1'. This will provide an additional 1.6KV boost.

There are two types of local control panels associated with this regulator. Instructions for both are included in this template.

Functions: Opening, Closing, Tap Changing
Rating: 12.8 MVA
Insulant: Oil/ Air
Voltage: 22 kV

Control Panel Type A
Adjusting the Regulator to Neutral Tap– Electrical

1 Open the regulator control cabinet door.

2 Rotate the 'S4 SUPERVISORY SEL' switch ACW to the 'LOCAL' position.

3 Rotate the 'S2 TAP CHANGER SEL' switch ACW to the 'MAN' position.

4 Lower / raise the tap changer to the neutral tap position (5 or 1) via the 'S3 TAP CHANGER SEL' switch.

5 Confirm the indicator gauge (black) points to the neutral tap position.

6 Confirm the correct neutral tap position - S or 1 - on the mechanical tap position indicator. Note: The black indicator points to the relevant tap. The red indicators show the tapping range.

7 On the Control Panel Type A rotate 'S1 MAINISOLATOR' switch ACW to the 'OFF' position.

Note: *Confirm the correct neutral tap position – 5 or 1 – prior to operating.*

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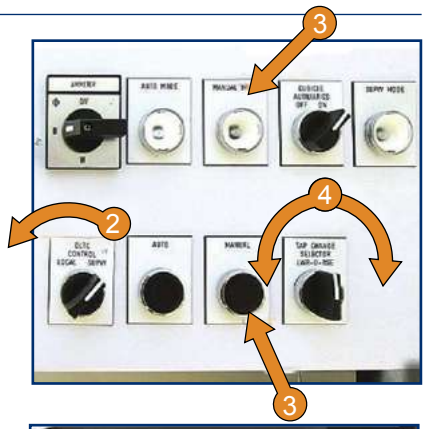
WILSON LINE REGULATOR (CONTINUED)

Control Panel Type B
Adjusting the Regulator to Neutral Tap – Electrical



1 Open the regulator control cabinet door.

2 Rotate the 'OLTC CONTROL' switch ACW to the 'LOCAL' position.

3 Press the 'MANUAL' button. The 'MANUAL MODE' indicating light will illuminate.

4 Lower I raise the tap changer to the neutral tap (5 or 1) position via the 'TAP CHANGER SELECTOR' switch.

5 Confirm the indicator gauge points to the neutral tap position.

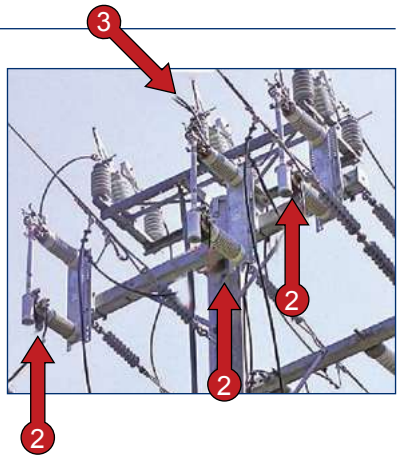
6 Confirm the correct neutral tap position - S or 1 - on the mechanical tap position indicator. Note: The black indicator points to the relevant tap. The red indicators show the tapping range.

7 On the Control Panel Type B rotate the 'CUBICLE AUXILIARIES' switch ACW to the 'OFF' position.....

8 ...On the Control Panel Type B rotate the 'CUBICLE AUXILIARIES' switch ACW to the 'OFF' position..

Note: *Confirm the correct neutral tap position – 5 or 1 – prior to operating.*

Closing the Regulator HV By-pass Switch



1 Confirm the regulator is on the neutral tap and the LV Supply switch is 'OFF'.

2 Confirm the S & C Boric Acid by-pass HV fuses are closed.

3 **CLOSE** the HV by-pass switch.

Note: *By-pass switches may vary in make and type. Refer to appropriate sections of this manual for operating instructions if required.*

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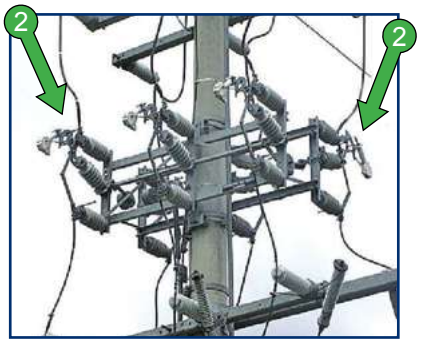
WILSON LINE REGULATOR (CONTINUED)

Opening the Regulator HV Isolating Switches



Note: *Confirm the HV by-pass switch is closed prior to opening the regulator HV isolating switches.*

1 Confirm the HV by-pass switch is closed.

2 Raise the regulator HV isolating switches operating handle firmly to the stop position to OPEN both the regulator HV isolating switches simultaneously.

Note: *Isolating switches may vary in make and type. Refer to appropriate sections of this manual for operating instructions if required.*

Control Panel Type A
Changing the Regulator Tap - Manually

Warning: *The regulator by-pass switch MUST NOT BE CLOSED when manually adjusting taps unless the regulator is out of service.*

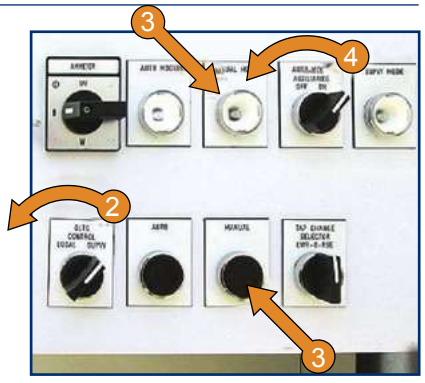
1 Open the regulator control cabinet door.

2 Rotate the 'S4 SUPERVISORY SEL' switch ACW to the 'LOCAL' position.

3 Rotate the 'S2 TAP CHANGER SEL' switch ACW to the 'MAN' position.

4 Rotate the 'S1 MAN ISOLATOR' switch ACW to the 'OFF' position OR.....

Control Panel Type B
Changing the Regulator Tap – Manually



Warning: *The regulator by-pass switch MUST NOT BE CLOSED when manually adjusting taps unless the regulator is out of service.*

1 .....open the regulator control cabinet door.

2 Rotate the 'OLTC CONTROL' switch ACW to the 'LOCAL' position.

3 Press the 'MANUAL' button. The 'MANUAL MODE' indicating light will illuminate.

4 Rotate the 'CUBICLE AUXILIARIES' switch ACW to the 'OFF' position.

5 Open the tap change control mechanism access door.

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WILSON LINE REGULATOR (CONTINUED)

6 Insert the manual tap change handle into the manual tap change mechanism as shown.

7 Rotate the handle in the required direction - ACW to lower taps, CW to raise taps - until the tap position indicator moves to the required tap position and the mechanical indicator points to the required tap number.

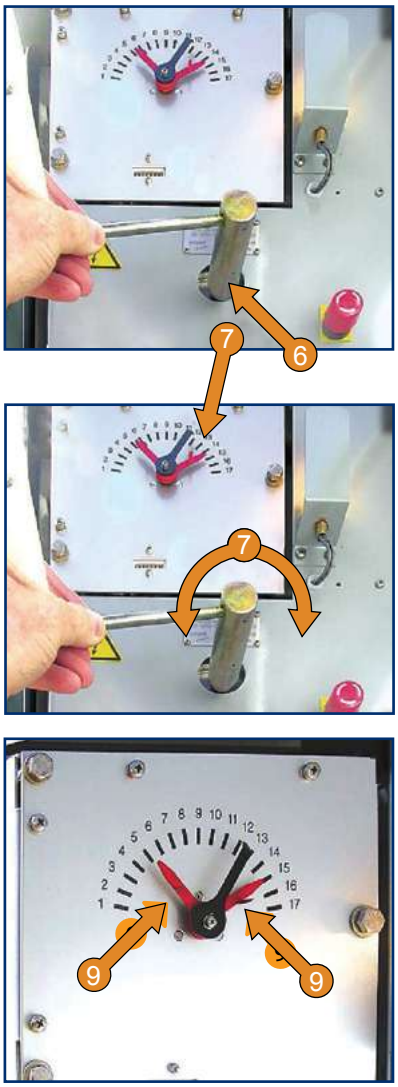
Note: *Once a manual tap change operation has been commenced it must be completed. 20 turns of the manual tap change handle are required for each tap position change.*

8 Remove the manual tap change handle.

9 If required reset the tap change mechanical indicator red 'range' indicators.

10 Close the tap change control mechanism access door.

Note: *Confirm the tap position via the mechanical indicator at the completion of the manual tap change operation.*



Control Panel Type A
Changing the Regulator Tap - Manually

11 Rotate the 'S1 MAIN ISOLATOR' switch CW to the 'ON' position as shown.

12 Rotate the 'S2 TAP CHANGER SEL' switch CW to the 'AUTO' position as shown.

13 Rotate the 'S4 SUPERVISORY SEL' switch CW to the 'REMOTE' position as shown OR.....

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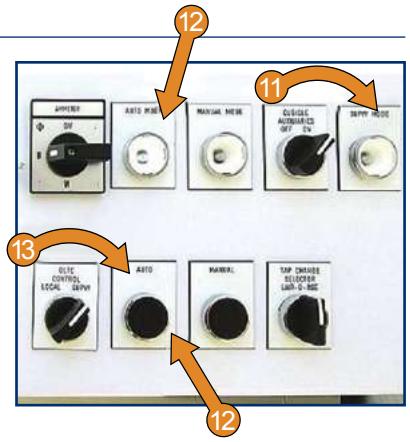
WILSON LINE REGULATOR (CONTINUED)

Control Panel Type B
Changing the Regulator Tap - Manually



11 ....rotate the 'CUBICLE AUXILIARIES' switch CW to the 'ON' position as shown.

12 Press the 'AUTO' button. The 'AUTO MODE' indicating light will illuminate.

13 Rotate the 'OLTC CONTROL' switch CW to the 'SUPVY' position as shown.

Changing the Regulator Rating – Manually

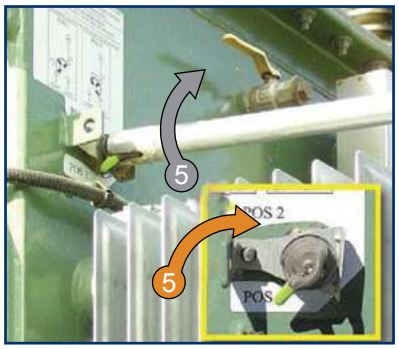
Warning: *the regulator must be de-energised before attempting to change the boost tap ratio.*

1 Confirm the regulator remote control is in the 'LOCAL' position.

2 Confirm the regulator LV supply switch is 'OFF'

3 Confirm the regulator HV by-pass switch is closed and the HV isolating switches are open.

4 Attach the provided operating handle to the regulator rating boost rotary switch as shown.



5 Using a firm and positive action rotate the rotary switch CW from 'POS 1' to 'POS 2'

6 Remove the operating handle.

7 Manually adjust the regulator to the new neutral tap '1'. Refer to the Changing the Regulator Tap – Manually instruction.

Notes: *Ensure the rotary switch is rotated to the stop position before removing the operating handle.*

Confirm *the regulator is on the new neutral tap '1' before re-energising the regulator.*

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CONTROL BOXES

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ENERGYLINE INTELLICAP CAPACITOR CONTROL BOX
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HARRIS ELECTRONIC CONTROL BOX
INTELLICAP PLUS OR ABB C200A CONTROLLER
KYLE FORM 3 / 3A ELECTRONIC RECLOSER CONTROL
KYLE FORM 4C ELECTRONIC RECLOSER
KYLE FORM 4C ELECTRONIC RECLOSER CONTROL
KYLE FORM 5: ELECTRONIC RECLOSER CONTROL
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NULEC LOOP AUTOMATION ELECT CONTROL BOX
QEI CAPACITOR CONTROL BOX
S&C INTELLICAP PLUS CAPACITOR CONTROL BOX
SCHNEIDER NULEC ADVC2 ELECTRONIC CONTROL BOX
SCHNEIDER NULEC W SERIES REMOTE CONTROLLED SWER ACR
SIEMENS REMOTE FUSESAVER CONTROL UNIT

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AIR CAPACITOR CONTROL BOX

Functions:	Opening, Closing
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Prior to any operation

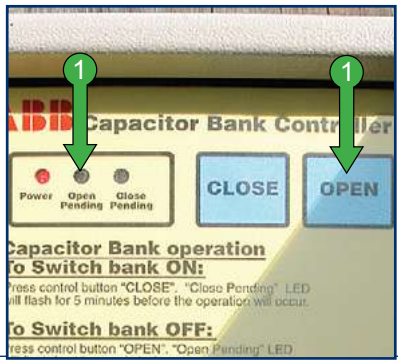
- Confirm the capacitor units are fit for service prior to and after operation.
- Ensure all three capacitor vacuum switches have operated correctly.
- The capacitor bank vacuum switches cannot be closed for app. five (5) minutes after being opened.
- Confirm the control box location and labelling prior to operation.

Opening the Capacitor Vacuum Switches

1 Press the OPEN button. The OPEN PENDING LED will flash for ten (10) seconds prior to the vacuum switches opening.

2 Confirm all three vacuum switches have opened correctly.

Note: *To cancel the pending operation press the CLOSE button.*

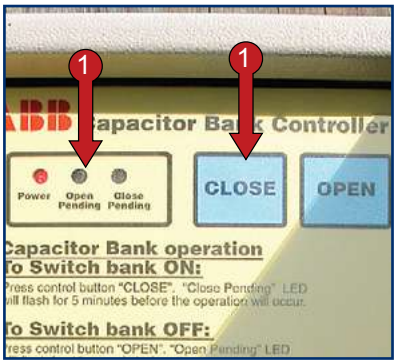


Closing the Capacitor Vacuum Switches

1 Press the CLOSE button. The CLOSE PENDING LED will flash for five (5) minutes prior to the vacuum switches closing.

2 Confirm all three vacuum switches have closed correctly.

Note: *To cancel the pending operation press the open button.*



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COOPER CAPACITOR CONTROL BOX

Functions: Opening, Closing
Rating: N/A
Insulant: N/A
Voltage: N/A

Prior to any operation:

- Confirm the capacitor units are fit for service prior to and after operation.
- Ensure all three capacitor vacuum switches have operated correctly.
- The capacitor bank vacuum switches cannot be closed for app. five (5) minutes after being opened.
- Confirm the control box location and labelling prior to operation.

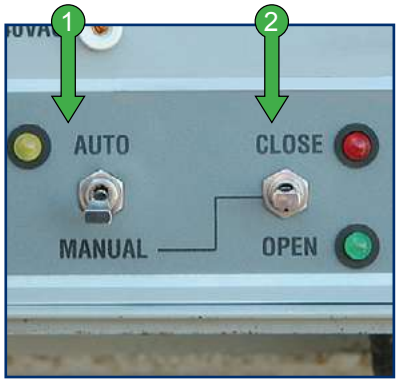
Opening the Capacitor Vacuum Switches

1 Switch the AUTO / MANUAL toggle switch to the MANUAL position.

2 Lower the CLOSE / OPEN toggle switch to the **OPEN** position. Wait app. seven (7) seconds for the vacuum switches to trip.

3 Confirm all three vacuum switches have opened correctly.

Note: *If an Access Permit is to be issued then the AUTO / MANUAL toggle switch must remain in the MANUAL position.*



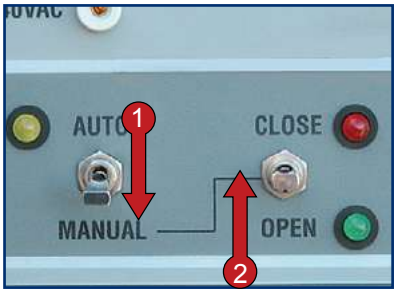
Closing the Capacitor Vacuum Switches

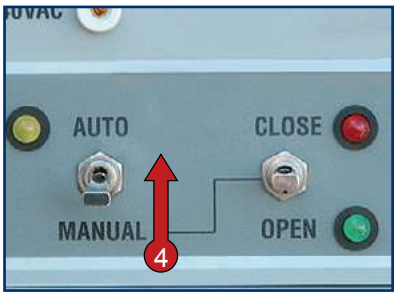
1 Switch the AUTO / MANUAL toggle switch to the MANUAL position.

2 Raise the CLOSE / OPEN toggle switch to the **CLOSE** position. Wait app. one (1) minute for the vacuum switches to close.

3 Confirm all three vacuum switches have closed correctly.

4 Switch the AUTO / MANUAL toggle switch to the AUTO position.





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ENERGYLINE INTELLICAP CAPACITOR CONTROL BOX

Functions: Opening, Closing
Rating: N/A
Insulant: N/A
Voltage: N/A

Prior to any operation

- Confirm the capacitor units are fit for service prior to and after operation.
- Ensure all three capacitor vacuum switches have operated correctly.
- The capacitor bank vacuum switches cannot be closed for app. five (5) minutes after being opened.
- Confirm the control box location and labelling prior to operation.

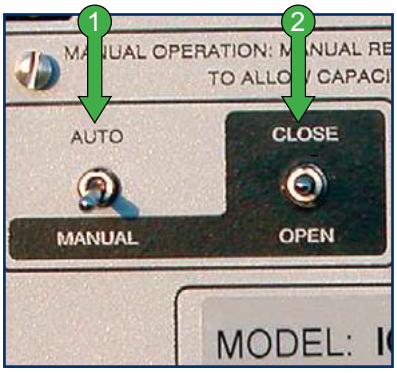
Opening the Capacitor Vacuum Switches

1 Switch the MANUAL / AUTO toggle switch to the MANUAL position.

2 Switch the CLOSE / OPEN toggle switch to the **OPEN** position. Wait app. thirty (30) seconds for the vacuum switches to trip.

3 Confirm all three vacuum switches have opened correctly.

Note: *If an Access Permit is to be issued then the MANUAL / AUTO toggle switch must remain in the MANUAL position.*



Closing the Capacitor Vacuum Switches

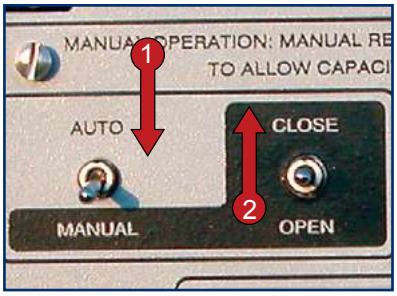
1 Switch the MANUAL / AUTO toggle switch to the MANUAL position.

2 Switch the CLOSE / OPEN toggle switch to the **CLOSE** position. Wait app. thirty (30) seconds for the vacuum switches to close..

3 Confirm all three vacuum switches have closed correctly.

4 Switch the MANUAL / AUTO toggle switch to the AUTO position.

5 Ensure all three vacuum switches have closed correctly.



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FISHER PIERCE CAPACITOR CONTROL BOX

Prior to any operation

- Confirm the capacitor units are fit for service prior to and after operation.
- Ensure all three capacitor vacuum switches have operated correctly.
- Note the capacitor bank vacuum switches cannot be closed for app. five (5) minutes after being opened.
- Confirm the control box location and labelling prior to operation.

Functions:	Opening, Closing
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

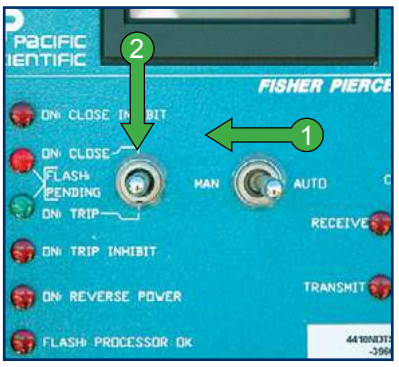
Opening the Capacitor Vacuum Switches

1 Switch the MAN / AUTO toggle switch to the MAN position.

2 Lower the CLOSE / TRIP toggle switch to the TRIP position. Wait app. seven (7) seconds for the vacuum switches to trip.

3 Confirm all three vacuum switches have opened correctly.

4 If an Access Permit is to be issued then the MAN / AUTO toggle switch must remain in the MAN position.

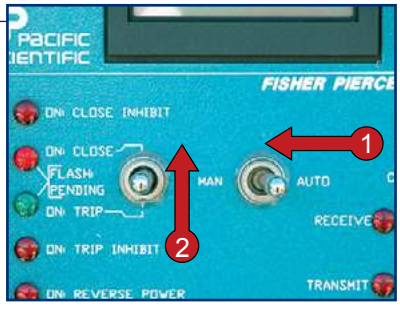


Closing the Capacitor Vacuum Switches

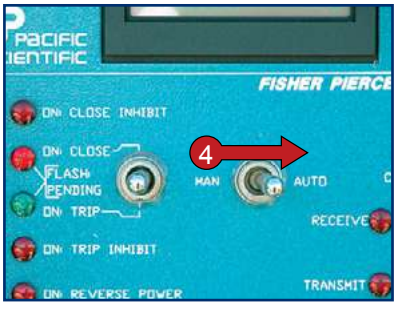
1 Switch the MAN / AUTO toggle switch to the MAN position.

2 Raise the CLOSE / TRIP toggle switch to the CLOSE position. Wait app. one (1) minute for the vacuum switches to close.

3 Confirm all three vacuum switches have closed correctly.



4 Switch the MAN / AUTO toggle switch to the AUTO position.



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HARRIS ELECTRONIC CONTROL BOX

Prior to any operation:

- This control box is only used with NGK Gas Automatable HV Switches.
- Confirm the gas switch location and labelling prior to operation.

Functions: Open, Close, Electrical Local/ Remote, Fault Indicator
Insulant: N/A
Voltage: N/A

Closing the Gas Switch - Local Electrical

1 Rotate the remote control switch to the 'LOCAL' position.

2 Push the **GREEN** 'CLOSE' button to CLOSE the gas switch.

3 Confirm the semaphores agree with the gas switch status.

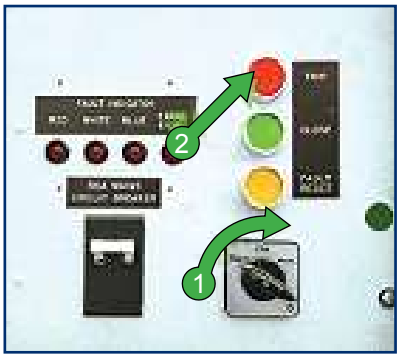
Opening the Gas Switch – Local Electrical

1 Confirm Rotate the remote control switch to the 'LOCAL' position.

2 Push the **RED** 'TRIP' button to OPEN the gas switch.

3 Confirm the semaphores agree with the gas switch status.

Note: *If the gas switch is an isolation point for an Access Permit then the selector switch must be placed in the 'MANUAL' position after opening the gas switch.*



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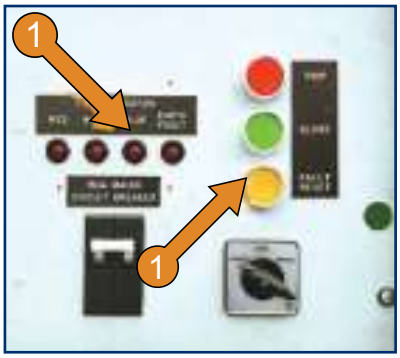
HARRIS ELECTRONIC CONTROL BOX (CONTINUED)

Resetting the Fault Indicators

1 Check the fault indicator lamp targets and if required press the yellow ‘FAULT RESET’ button to reset the indicator lamp targets.



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INTELLICAP PLUS OR ABB C200A CONTROLLER

Prior to any operation:

- Confirm the capacitor units are fit for service prior to and after operation.
- Ensure all three capacitor vacuum switches have operated correctly.
- Note: The capacitor bank vacuum switches cannot be closed for app. five (5) minutes after being opened.
- Confirm the control box location and labelling prior to operation.

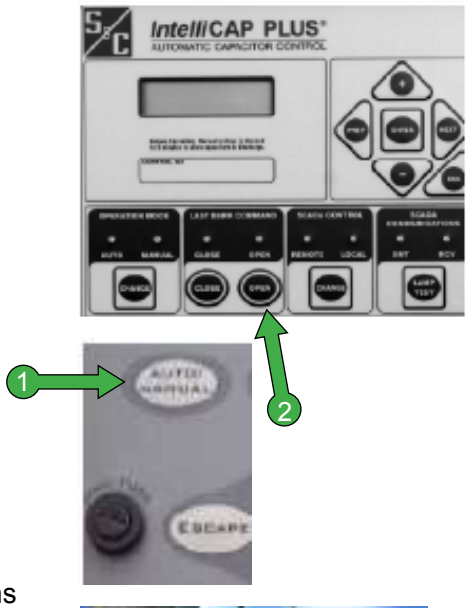
Operation Options:	Opening, Closing
Rating:	N/A
Insulant:	N/A
Voltage:	22kV

Opening of Capacitor Bank

1 Switch the Control Selector switch to “MANUAL”

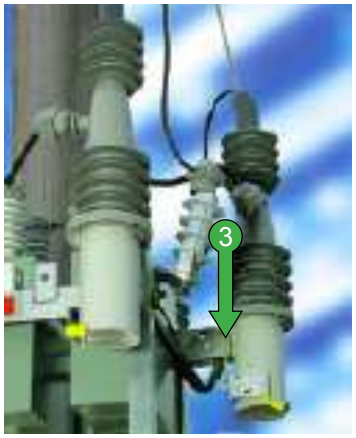
2 OPEN the Vacuum Switches (Electronically).

Note: *Capacitor bank will take 30 seconds to operate.*



3 Check all vacuum switches are indicating OPEN by means of their mechanical semaphores (Down Position).

Note: *Allow five minutes discharge time.*



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INTELLICAP PLUS OR ABB C200A CONTROLLER (CONTINUED)

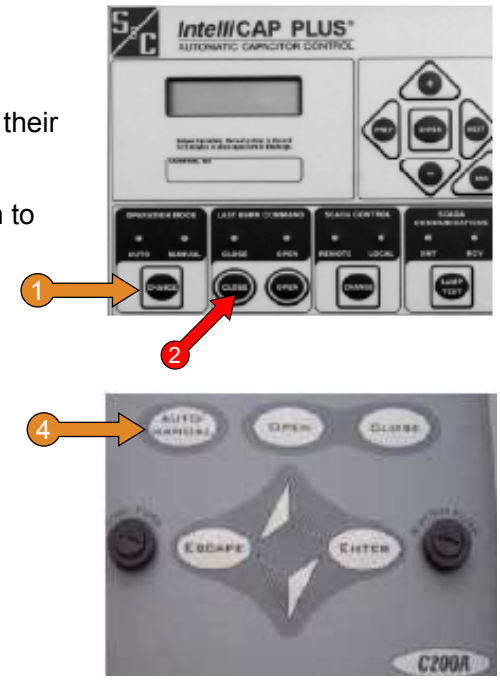
Closing of Capacitor Bank

1 Check the control selector switch is in “MANUAL”

2 **CLOSE** the vacuum switch (Electronically).

3 Check all vacuum switches are CLOSED by means of their mechanical semaphores (UP Position)

4 Restore where applicable the capacitor selector switch to “AUTO”.



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KYLE FORM 3 / 3A ELECTRONIC RECLOSER CONTROL

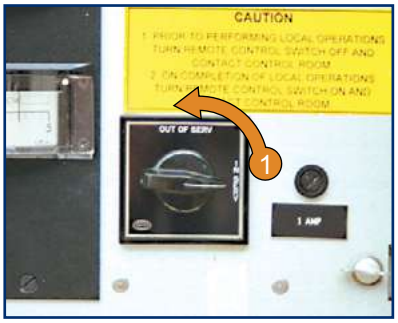
Prior to any operation

- This control box may control various types of ACR. Confirm the ACR type on site prior to operation.
- The remote control switch MUST be in the 'OUT OF SERV' position before supressing the auto reclose and earth leakage protection.

Functions:	Open, Close, Electrical Local/ Remote, Fault Indicator
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Supressing the ACR Remote Control

1 Rotate the ACR remote control suppression switch ACW from the 'IN SERV' position to the 'OUT OF SERV' position to supress remote control of the ACR.

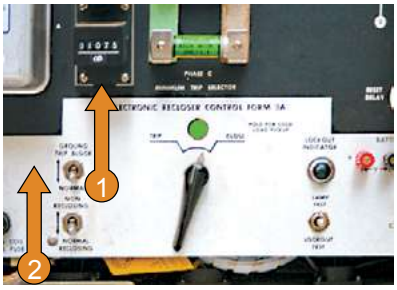


Note: *The remote control switch MUST be in the 'OUT OF SERV' position prior to manual supression of the auto reclose and earth leakage protection – and for electrical access permit.*

Supressing the ACR & Earth Leakage Prot.

1 To supress the earth leakage protection, raise the earth leakage toggle switch to the 'GROUND TRIP BLOCK' position.

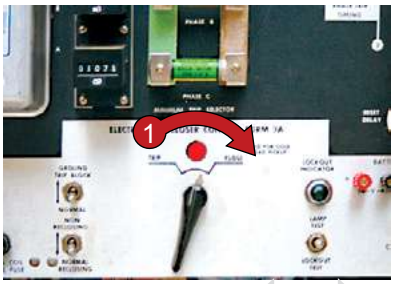
2 To supress the auto reclose function, raise the ARC toggle switch to the 'NON RECLOSING' position.



Closing the ACR – Local Electrically

1 Rotate the SCR control lever CW to the stop position and hold for approximately five (5) seconds to close the ACR. Return the control lever to the centre position.

2 Confirm the semaphores agree with the ACR status.



Note: *The auto reclose must be supressed before closing the ACR after lockout.*

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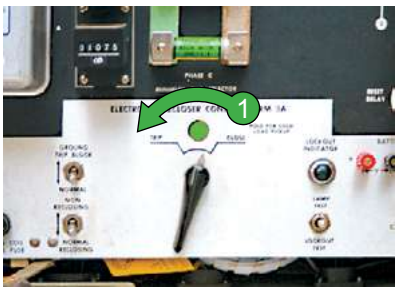
KYLE FORM 3 / 3A ELECTRONIC RECLOSER CONTROL (CONTINUED)

Opening the ACR – Locally Electrically

1 Rotate the ACR control lever ACW to the stop position to open ACR. Return the control lever to the centre position.

2 Confirm the semaphores agree with the ACR status.

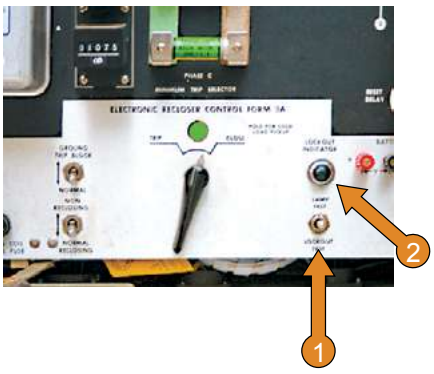


Confirming the ACR has gone to Lockout

1 Raise the lockout toggle switch to the 'LAMP TEST' position.

2 Confirm the lamp illuminates.

3 Lower the lockout toggle switch to the 'LOCKOUT TEST' position. If the lamp is illuminated, then the ACR has locked out.



Closing the ACR After Lockout

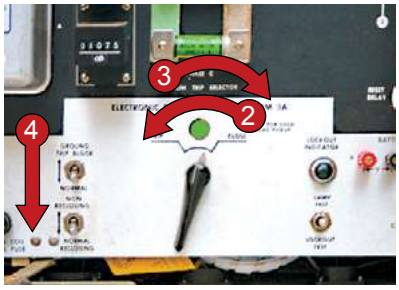
1 Supress the ACR auto reclose function.

2 Rotate the ACR control lever ACW to the stop position and release.

3 Rotate the ACR control lever CW to the stop position and hold for approximately five (5) seconds then release to close the ACR.

4 Lower the auto reclose toggle switch to the 'NORMAL RECLOSING' position.

Note: *Receive instruction from the Control Room before reclosing the ACR.*



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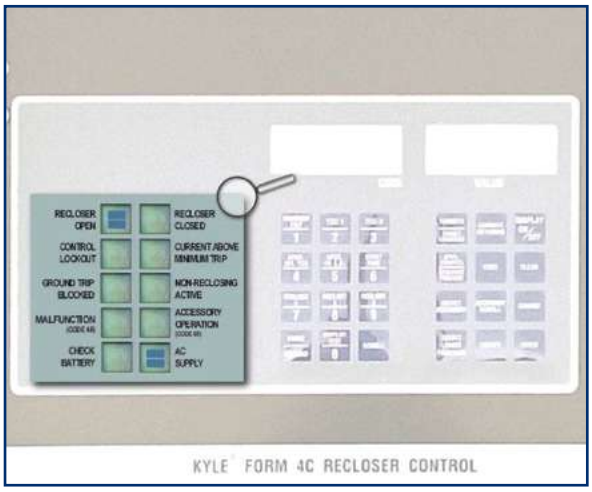
KYLE FORM 4C ELECTRONIC RECLOSER

Prior to any operation

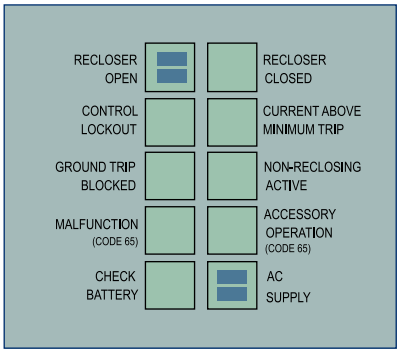
- For Common Function Codes refer to the table on page 4 of this section.
- Warning: Suppressing the ACR remote control locally via the toggle switch will remove any suppressions applied via a supervisory signal from the control room. (ie. Controller suppression of the ground trip or reclose function.) Check the LCD indicators on the local control panel for the actual status of the ACR
- Confirm the ACR location and labelling prior to any operation.

Functions:	Open, Close, Electrical Local/ Remote, Fault Indicator
Rating:	N/A
Insulant:	N/A
Voltage:	N/A



LCD Indicators - Normal Operation

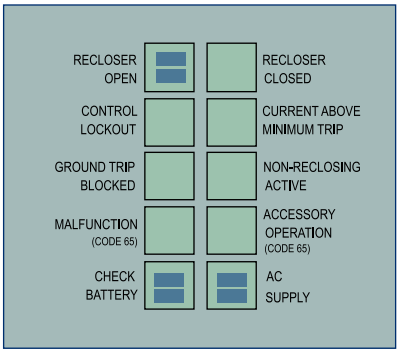
1 Under normal operation only the ‘RECLOSER CLOSED’ or ‘RECLOSER OPEN’ and ‘AC SUPPLY’ indicator bars should be showing. ‘AC SUPPLY’ indicates presence of AC power.



LCD Indicators - Check Battery

1 Indicator bars in the ‘CHECK BATTERY’ display indicate the battery needs immediate attention.

Note: *If required log the data and report to the appropriate personnel.*



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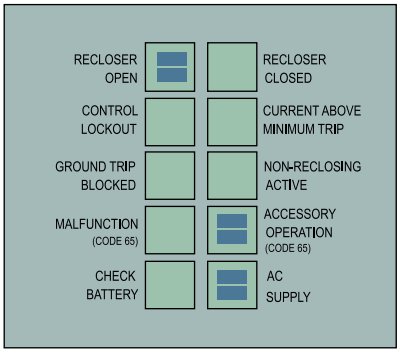
KYLE FORM 4C ELECTRONIC RECLOSER (CONTINUED)

LCD Indicators – Accessory Operation

1 Indicator bars in the 'ACCESSORY OPERATION' display indicate special accessory operations:

- High current lockout.
- Remote trip lockout.
- Supervisory trip lockout.

Note: *If required log the data and report to the appropriate personnel.*

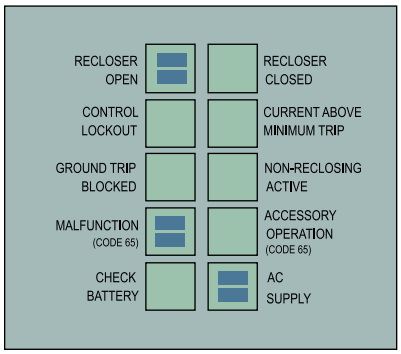


LCD Indicators – Malfunction (Code 65)

1 Indicator bars in the 'MALFUNCTION' display indicate when one of the five (5) monitored malfunctions are detected:

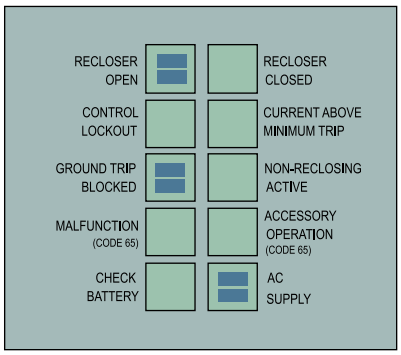
- Failure to close from the supervisory signal.
- Low battery voltage.
- Power down in less than the programmed time.
- Failure to close from the manual control switch.
- Internal diagnostics alarm.

Note: *If required log the data and report to the appropriate personnel.*



LCD Indicators – Ground Trip Blocked

1 Indicator bars in the 'GROUND TRIP BLOCKED' display indicate ground trip (earth leakage) is blocked (suppressed). Suppression can be via manual operation or supervisory signal.



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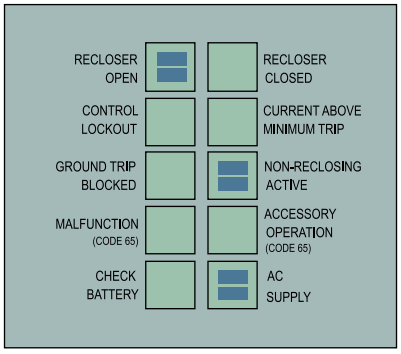
KYLE FORM 4C ELECTRONIC RECLOSER (CONTINUED)

LCD Indicators – Non Recloser Active

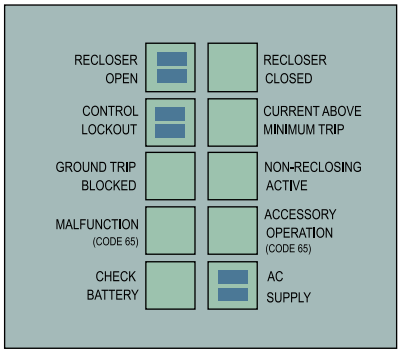
1 Indicator bars in the NON RECLOSER ACTIVE indicator display indicate when the auto reclose is suppressed. Suppression can be via manual operation or supervisory signal.



LCD Indicators – Control Lockout

1 Indicator bars in the 'CONTROL LOCKOUT' display indicate that the controller has cycled through its preprogrammed operations to lockout sequence.

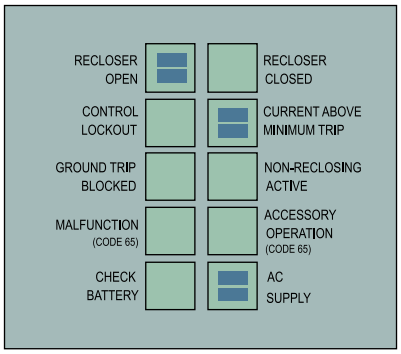
Note: *If required log the data and report to the appropriate personnel.*



LCD Indicators - Current Above Minimum Trip

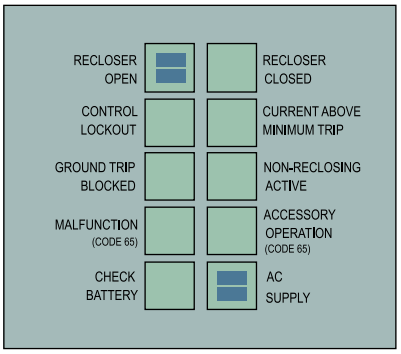
1 Indicator bars in the 'CURRENT ABOVE MINIMUM TRIP' display indicate that the current passing through the recloser is above one of the preprogrammed trip levels. i.e. When current exceeds phase to phase, min. op. or earth leakage settings (ACR will trip).

Note: *If required log the data and report to the appropriate personnel.*



LCD Indicators – Recloser Open

1 Indicator bars in the 'RECLOSER OPEN' display indicate the recloser contacts open.



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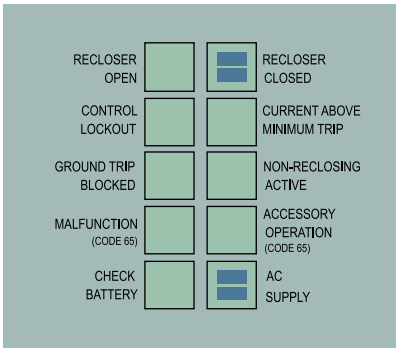
KYLE FORM 4C ELECTRONIC RECLOSER (CONTINUED)

LCD Indicators – Recloser Closed

1 Indicator bars in the 'RECLOSER CLOSED' display indicate the recloser contacts closed.



Common Function Codes

CODE	FUNCTION	
30	EXAMINE TARGETS	
32	EXAMINE TARGET COUNTER	GROUND
33	EXAMINE TARGET COUNTER	1-2 A PHASE
34	EXAMINE TARGET COUNTER	3-4 B PHASE
35	EXAMINE TARGET COUNTER	5-6 C PHASE
36	EXAMINE TARGET COUNTER	SGF.
39	TOTAL OPERATIONS COUNTER	
40	INSTANTANEOUS CURRENT	GROUND
41	INSTANTANEOUS CURRENT	1-2 A PHASE
42	INSTANTANEOUS CURRENT	3-4 B PHASE
43	INSTANTANEOUS CURRENT	5-6 C PHASE
48	MAXIMUM DEMAND CURRENT	GROUND
49	MAXIMUM DEMAND CURRENT	1-2 A PHASE
48	MAXIMUM DEMAND CURRENT	3-4 B PHASE
49	MAXIMUM DEMAND CURRENT	5-6 C PHASE

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KYLE FORM 4C ELECTRONIC RECLOSER CONTROL

Prior to any operation

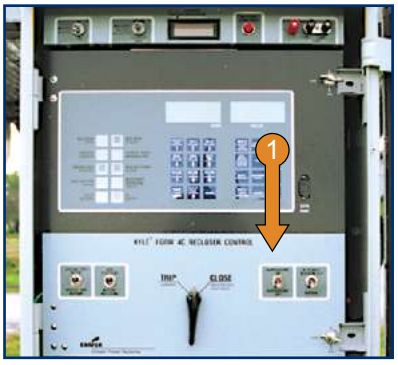
- This control box is used with the NGK Gas Automatable HV switches and RVE/VWVE auto circuit reclosers.
- For fault interrogation, refer to 'Kyle Form C Electronic Recloser Basic Functionality' in this section.
- WARNING. Suppressing the ACR remote control locally via the toggle switch will remove any suppressions applied via a supervisory signal from the control room (ie Controller suppression of the ground trip or reclose function). Check the LCD indicators on the local control panel for the actual status of the ACR.
- Confirm ACR location and labelling prior to operation.

Functions:	Open, Close, Electrical Local/ Remote, Fault Indicator
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Suppressing the ACR Remote Control

Warning. *Refer to WARNING above before proceeding.*

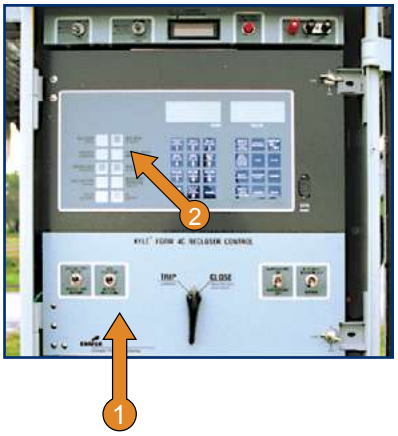
1 Lower the Supervisory ON / OFF toggle switch to the 'SUPERVISORY OFF' position to suppress remote control of ACR..



Supressing the ACR Auto Reclose

1 Raise the Auto reclose toggle switch to the 'NON RECLOSING' position to suppress the ACR auto reclose.

2 Confirm the LCD indicators showing non reclosing is active..



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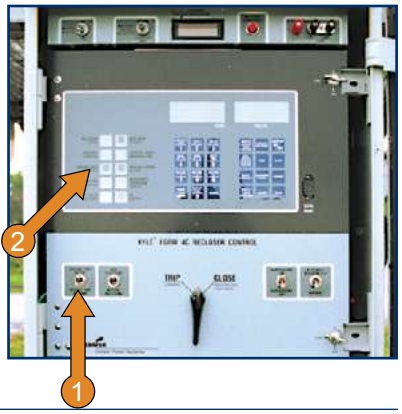
KYLE FORM 4C ELECTRONIC RECLOSER CONTROL (CONTINUED)

Suppressing the ACR Earth Leakage Prot.

1 Raise the earth Leakage toggle switch to the 'GROUND TRIP BLOCK' position to suppress the ACR earth leakage protection.

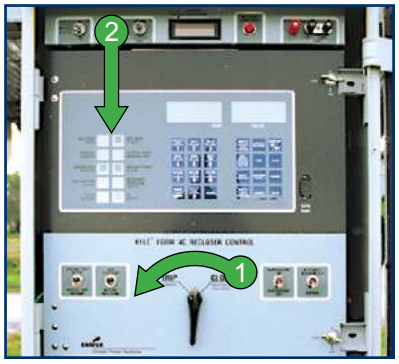
2 Confirm the LCD indicators show the ground trip is blocked..



Opening the ACR – Local Electrically

1 Rotate the ACR control lever ACW to the stop position and release to OPEN the ACR.

2 Confirm the LCD indicators show the recloser is open..

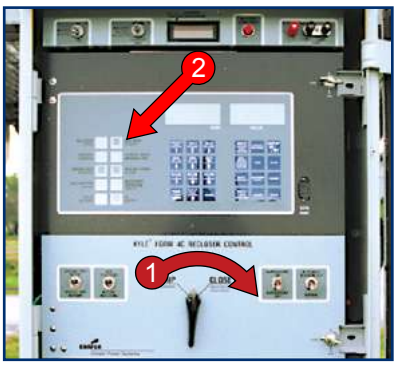


Closing the ACR – Local Electrically

1 Rotate the ACR control lever CW to the stop position and hold for approximately five (5) seconds, then release to CLOSE the ACR.

2 Confirm the LCD indicators show the recloser is closed.

Note: *The auto reclose must be suppressed before closing the ACR after lockout.*



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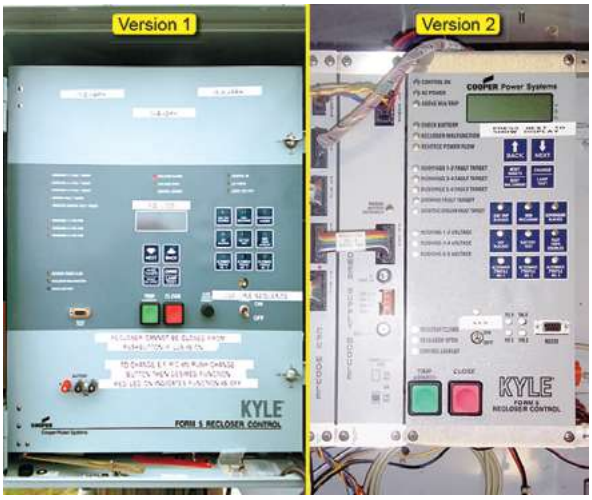
KYLE FORM 5: ELECTRONIC RECLOSER CONTROL

Prior to any operation:

- This control box can be used with the NGK Gas Automatable HV switches. LM RVE / VWVE ACRs and Nova ACRs.
- Note: There are two (2) versions of this control box (both shown in the main picture). The layout of the control buttons differ, however the functionality remains the same for both units. Ensure the correct identification of buttons prior to any operation.
- **All instructions here refer to Version 1 of the control box.**
- Confirm ACR/switch location and labelling prior to operation

Functions:	Open, Close, Electrical Local/ Remote, Fault Indicator
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

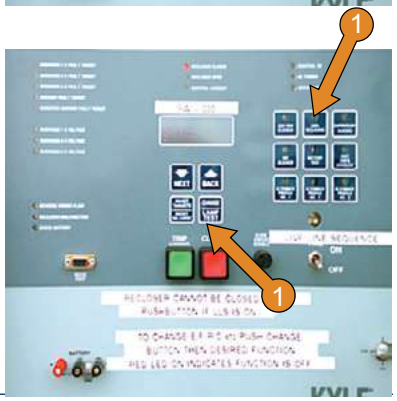


Suppressing the ACR Remote Control

1 Press the ‘CHANGE’ button then press the ‘SUPERVISORY BLOCKED’ button to disable the ACR remote operation.

Suppressing the ACR Auto Reclose

1 Press the ‘CHANGE’ button then press the ‘NON RECLOSING’ button to suppress the ACR auto reclose.



Suppressing of ACR Earth Leakage Prot.

1 Press the ‘CHANGE’ button then press the ‘GRD TRIPPED BLOCKED’ button, then.....

2 ....press the ‘CHANGE’ button to suppress the ACR earth leakage protection. Red lights will illuminate to show the earth leakage protection is suppressed.

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KYLE FORM 5: ELECTRONIC RECLOSER CONTROL (CONTINUED)

Enabling of ACR Live Line Sequence

1 Move Live Line Sequence toggle switch to the 'ON' position to enable Live Line Sequence protection.

Note: *ACR will not close whilst live line sequence is enabled..*

Closing the ACR – Electrically

1 Press the 'CHANGE' button then press the 'SUPERVISORY BLOCKED' button to disable remote operation.

2 Press the red 'CLOSE' button to CLOSE the ACR/HV switch.

3 Confirm the semaphores agree with the ACR/HV switch status.

Note: *The ACR/HV switch can be closed with the control in remote mode.*

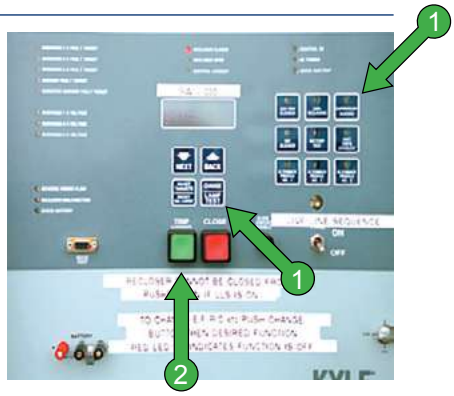
Opening the ACR – Electrically

1 Press the 'CHANGE' button then press the 'SUPERVISORY BLOCKED' button to disable the remote operation.

2 Press the green 'TRIP' button to OPEN the ACR/HV switch.

3 Confirm the semaphores agree with the ACR/HV switch status.

Note: *If the ACR/HV switch is an isolation point for an electrical access permit, the supervisory control must be blocked.*



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KYLE FORM 6 CONTROLLER

Functions:	Open, Close, Electrical Local/ Remote, Fault Indicator
Rating:	N/A
Insulant:	N/A
Voltage:	22 KV

Prior to any operation:

- This control box can be used with the NGK Gas Automatable HV switches. LM RVE / VWVE ACRs and Nova ACRs.
- Note: There are two (2) versions of this control box (both shown in the main picture). The layout of the control buttons differ, however the functionality remains the same for both units. Ensure the correct identification of buttons prior to any operation.
- **All instructions here refer to Version 1 of the control box.**
- Confirm ACR/switch location and labelling prior to operation.

Placing into Local Control

1 Press the ‘CHANGE’ button.

2 Press the ‘SUPERVISORY OFF’ button (This will to disable the remote control function of the ACR).

3 The light on the SUPERVISORY OFF button will illuminate indicating control unit is now in local function.

KYLE FORM 6 CONTROLLER

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KYLE FORM 6 CONTROLLER (CONTINUED)

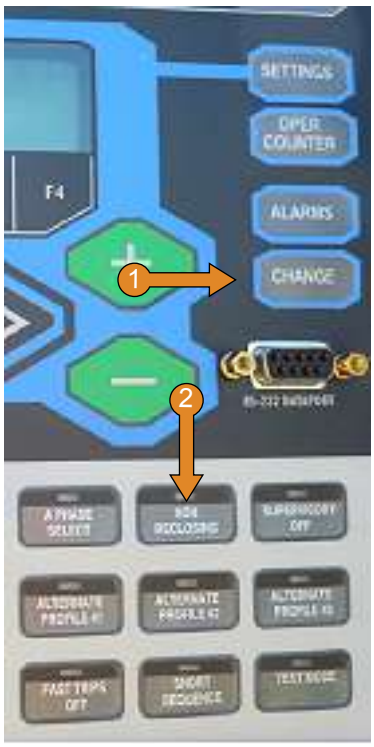
Auto Reclose Suppression

1 Press the ‘CHANGE’ button.

2 Press the ‘NON RECLOSING’ button. (This will suppress the ACR auto reclose).

3 Non Reclosing button will be illuminated.

“Supervisory Off” button does need to be selected to suppress or enable the Auto Reclose function.



Enabling Live Line Sequence

Note: *Placing the HOT LINE TAG switch “ON” places the ACR protection to minimum trip operation and its fastest inverse time curve.*

1 Move the ‘HOT LINE TAG’ toggle switch to the “ON” position (This will enable Live Line sequence).

2 Move the ‘HOT LINE TAG’ toggle switch to the “OFF” position (This will disable Live Line sequence).

Note: *If Live Line sequence is enabled by the toggle switch, it must be disabled (turned off) at toggle switch. If Live Line sequence is enabled by SCADA it must be disabled (switched off) by SCADA.*

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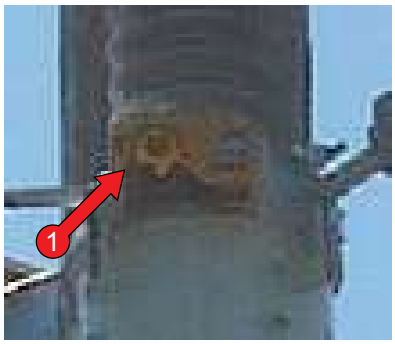
KYLE FORM 6 CONTROLLER (CONTINUED)

Closing the ACR

At the SWER ACR unit

1 Confirm the Yellow Operation lever on ACR up to **CLOSE** position.



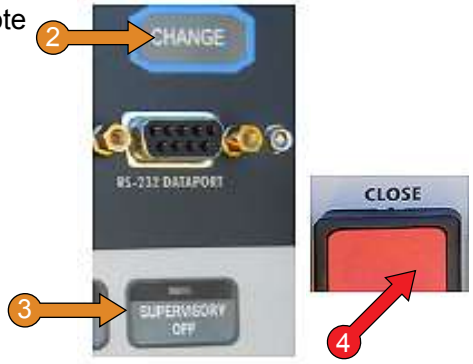
Note- *This will not close the unit but will allow the unit to be closed at the control panel*

At the Controller

2 Press the 'CHANGE' button.

3 Press the 'SUPERVISORY OFF' button (disable the remote control function).

4 Press the red 'CLOSE' button to **CLOSE** the ACR.



At the SWER ACR unit

5 Confirm semaphore agrees with ACR status.

Opening the ACR Electrically

At the SWER ACR unit

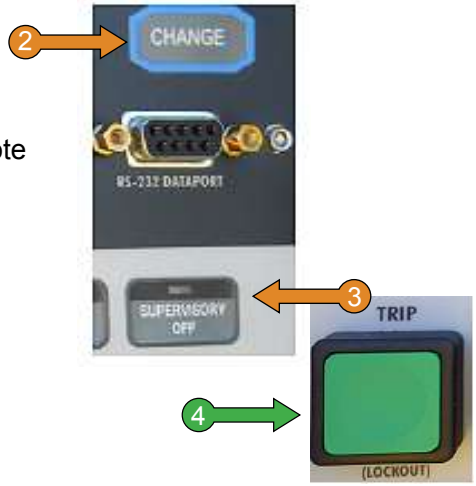
1 Confirm the position of the Yellow Operation lever is up and the semaphore is red showing (closed) on ACR, this indicates the ACR is in the closed position

At the Controller

2 Press the 'CHANGE' button

3 Press the 'SUPERVISORY OFF' button (disable the remote control function)

4 Press the green 'TRIP' button to **OPEN** the ACR



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KYLE FORM 6 CONTROLLER (CONTINUED)

At the SWER ACR unit

5 Confirm semaphore agrees with ACR status (yellow operation lever on ACR is in the up position & green semaphore is open) this means the ACR is the open position

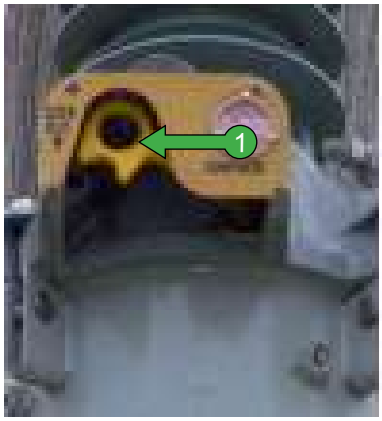
Note: *This is how you will find the unit if it has gone to lock out*

Opening the ACR Manually

Note: *The yellow operating level shall only be used in a condition when the ACR unit can not be operated electrically.*

At the SWER ACR unit

1 Using an approved operating stick pull the yellow lever down to OPEN ACR unit



Note: *The unit cannot be closed manually.*

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MERLIN GERIN RM6 REMOTE CONTROL INTERFACE

Functions: Opening, Closing
Rating: N/A
Insulant: SF6
Voltage: 22kV

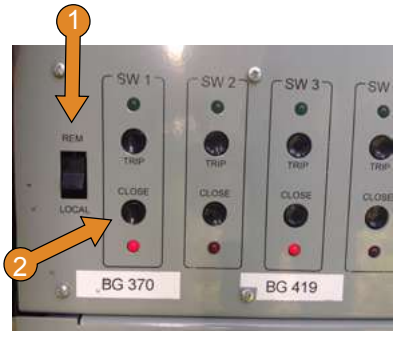
Prior to any operation:

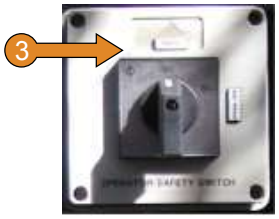
- If equipped with a gas indication gauge check for adequate pressure prior to switching.
- Confirm the remote / local switch is in the remote position Confirm HV switch location and labelling prior to operation.
- For any local operation ensure the “Remote / Local” (R/L) switch is in the “Local” (L) position
- Prior to local electrical operation confirm the remote control box is powered for service.

Open / Close Switch by Local Operation

1 Ensure the “Remote / Local” (R/L) switch is in the “Local” (L) position.

2 Confirm switch to operate, TRIP or CLOSE the switch by pressing the appropriate button, the switch is motorised and will automatically operate according to the command. The LED display will indicate the switch operation.





3 Disable the operation of the HV switch by switching the “Operator Safety Switch” to the SAFE position.

Note: *The “Operator Safety Switch” inhibits any close control, both local & remote for the HV switches*

4 Confirm the operation of the switch by checking the mimic panel on the RM6 switch unit

Note: *The Authorised Electrical Operator is responsible to note the condition of the Operator Safety Switch on the Access Permit when required.*

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NGK STANGER GAS SWITCH CONTROL MODULE

Functions: Opening, Closing, Isolation
Rating: N/A
Insulant: N/A
Voltage: N/A

Prior to any operation:

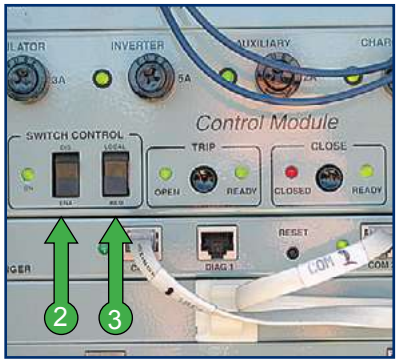
- Remote operation is always the preferred method of operation. This control box is only used on NGK gas switches.
- Confirm the gas switch is fit for service prior to operating.
- Note: If the gas switch is an isolation point for an Access Permit then the following must be done:
  - The 'LOCAL / REM' switch must be in the 'LOCAL' position.
  - The 'DIS / ENA' switch must be in the 'DIS' position.
- Confirm the gas switch location and labelling prior to operation.

Opening the Gas Switch – Local Electrical

1 Confirm the control panel is activated via the LEDs.

2 Confirm the 'DIS / ENA' switch is in the 'ENA' position.

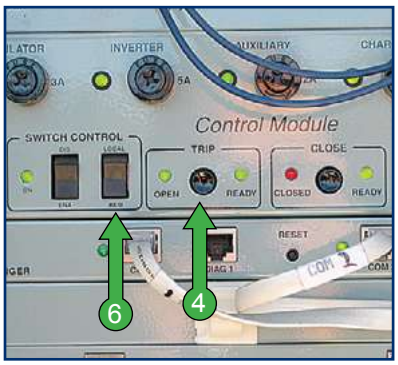
3 Switch the 'LOCAL / REM' switch to the 'LOCAL' position.



4 Press the 'TRIP' button to OPEN the gas switch.

5 Confirm the status of the gas switch via the indicating LEDs and semaphore.

6 Switch the 'LOCAL / REM' switch to the 'REM' position.



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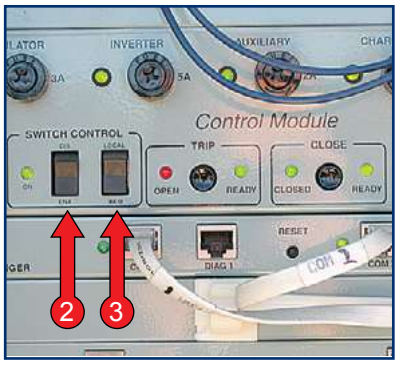
NGK STANGER GAS SWITCH CONTROL MODULE (CONTINUED)

Closing the Gas Switch – Local Electrical

1 Confirm the control panel is activated via the LEDs.

2 Confirm the ‘DIS / ENA’ switch is in the ‘ENA’ position.

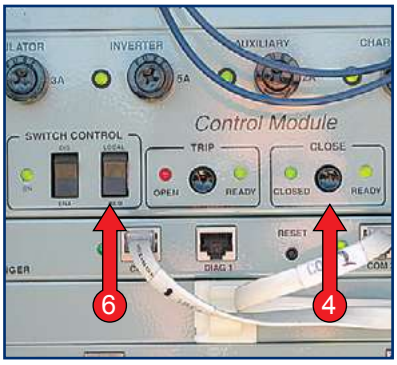
3 Switch the ‘LOCAL / REM’ switch to the ‘LOCAL’ position.



4 Press the ‘CLOSE’ button to **CLOSE** the gas switch.

5 Confirm the status of the gas switch via the indicating LEDs and semaphore.

6 Switch the ‘LOCAL / REM’ switch to the ‘REM’ position..



Note: *Confirm the ‘GAS OK’ and ‘HANDLE REMOTE’ LEDs are on. If either is off, then the gas switch cannot be controlled locally or remotely.*

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NGK STANGER GCR 100/300 GAS SWITCH CONTROL

Functions: Remote Electrical Open Close, Open Close Local Electric, Switch Stick Open Close, Lock and Tag, Spring Charge

Voltage: N/A

Prior to any operation

- Remote operation is always the preferred method of operation. This control box is only used on NGK gas switches. For remote operation the gas switch MANUAL ON/REMOTE semaphore must indicate REMOTE on the switch (white handle down).
- Confirm the gas switch is fit for service prior to operating.
- Note: If the gas switch is an isolation point for an Access Permit then the following must be done:
  - The 'LOCAL / REM' switch must be in the 'LOCAL' position.
  - The 'DIS / ENA' switch must be in the 'DIS' position.
- Confirm the gas switch location and labelling prior to operation.

Closing the Gas Switch – Local Electrical

1 Confirm the control panel is activated via the LEDs.

2 Confirm the 'DIS / ENA' switch is in the 'ENA' position.

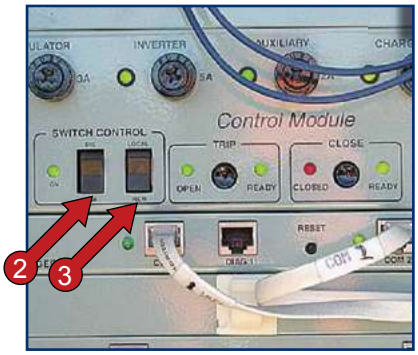
3 Switch the 'LOCAL / REM' switch to the 'LOCAL' position.

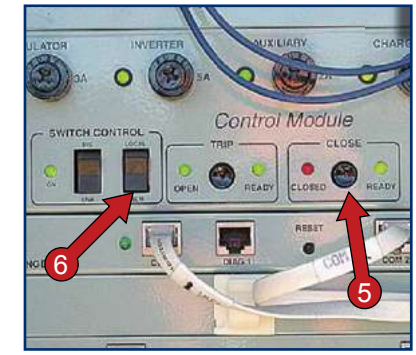
4 Press the 'CLOSE' button to CLOSE the gas switch.

5 Confirm the status of the gas switch via the indicating LEDs and semaphore.

6 Switch the 'LOCAL / REM' switch to the 'REM' position.

Note: *Confirm the 'GAS OK' and 'HANDLE REMOTE' LEDs are on. If either is off, then the gas switch cannot be controlled locally or remotely.*





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NGK STANGER GCR 100/300 GAS SWITCH CONTROL (CONTINUED)

Opening the Gas Switch – Local Electrical

1 Confirm the control panel is activated via the LEDs.

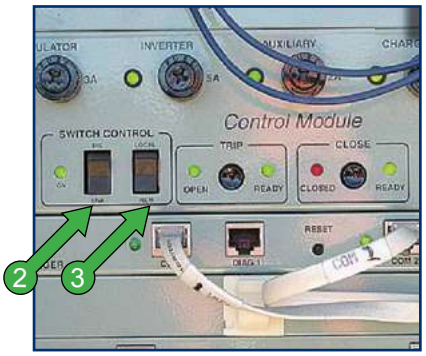
2 Confirm the 'DIS / ENA' switch is in the 'ENA' position.

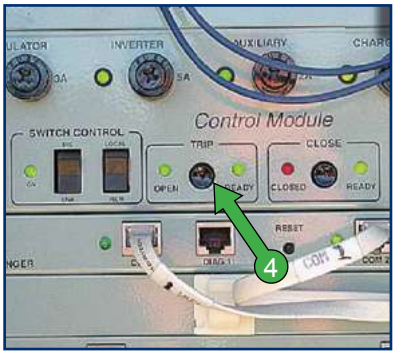
3 Switch the 'LOCAL / REM' switch to the 'LOCAL' position.

4 Press the 'TRIP' button to OPEN the gas switch.

5 Confirm the status of the gas switch via the indicating LEDs and semaphore.

Note: *Confirm the 'GAS OK' and 'HANDLE REMOTE' LEDs are on. If either is off, then the gas switch cannot be controlled locally or remotely.*



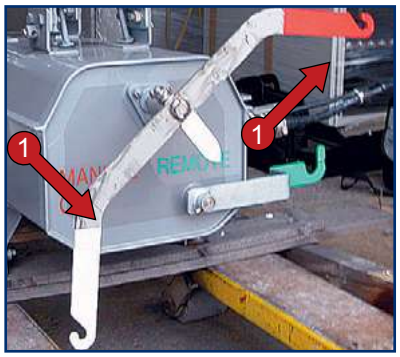


Closing the Gas Switch – Manually

1 Using a HV operating stick pull down the red lever to the stop position to close the HV switch. The indicator will point to 'MANUAL ON'.

2 Confirm the 'I/0' semaphore indicates 'I'.

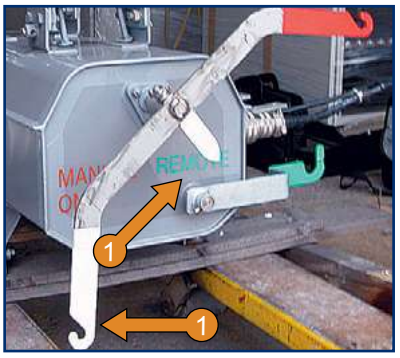
Note: *Ensure the control box 'LOCAL/REM' switch is in the 'LOCAL' position prior to operating the switch manually.*



Charging the Gas Switch Opening Spring

1 Using a HV operating stick pull down the white lever to the stop position to charge the operating spring. The indicator will point to 'REMOTE'. The HV switch can now be operated by the remote control box.

Note: *Ensure the control box 'LOCAL/REM' switch is in the 'LOCAL' position prior to operating the switch manually.*



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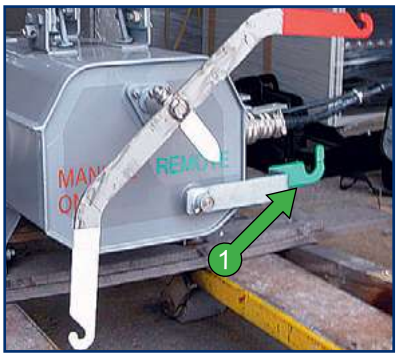
NGK STANGER GCR 100/300 GAS SWITCH CONTROL (CONTINUED)

Opening the Gas Switch - Manually

1 Using a HV operating stick pull down the green lever to the stop position to open the HV switch.

2 Confirm the 'I/0' semaphore indicates '0'.

Note: *Ensure the control box 'LOCAL/REM' switch is in the 'LOCAL' position prior to operating the switch manually.*



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NOJA CONTROLLER - ACR

Prior to any operation

- Confirm the ACR is fit for service prior to operating.
- Confirm the ACR location and labelling prior to operation.

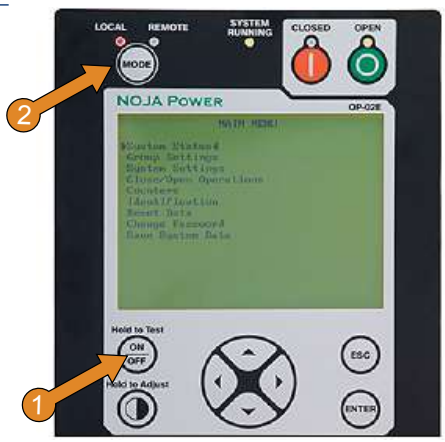
Functions:	Opening, Closing, Auto-reclose Suppression
Rating:	N/A
Insulant:	N/A
Voltage:	22 kV

Remote Function to Local Function

1 Press the ‘On/Off’ button

2 Press the ‘Local Remote’ Button (This will to disable the remote control function of the ACR).

The light on toggle switch will illuminate indicating the ACR is now in local control



Note: *Local/Remote Control.*

- *When in Local Control mode all Remote Control functions are inhibited.*
- *Tripping of the device is allowed regardless of control mode*

3 The ‘On/Off’ button does not need to be pressed again as the panel will turn off after 5 minutes of no activity

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NOJA CONTROLLER - ACR (CONTINUED)

Electronic Operation of ACR

At the Controller

1 Press the ‘On/Off’ button

2 Press the OPEN button once (This will open the ACR unit)

3 The LED “Open” button will illuminate indicating the ACR unit is open

4 If requiring to close the unit at step 2, push the close button and this will CLOSE the ACR unit

5 The ‘On/Off’ button does not need to be pressed again as the panel will turn off after 5 minutes of no activity

Auto reclose Suppression

At the Controller

1 Press the ‘On/Off’ button

2 Press the ‘Reclosing’ button once (This will suppress the ACR auto reclose)

3 The LED “Off” button will illuminate

4 The ‘On/Off’ button does not need to be pressed again as the panel will turn off after 5 minutes of no activity.

Enabling Live Line Sequence

At the Controller

1 Press the ‘On/Off’ button

2 Press the ‘Live Line’ button (This will enable the Live Line sequence on the ACR) The LED “On” button will illuminate and the Hot Line Tag LED will illuminate.

3 If Live Line sequence is enabled locally, it must be disabled (turned off) locally.

4 If Live Line sequence is enabled by SCADA it must be disabled (switched off) at SCADA

5 The ‘On/Off’ button does not need to be pressed again as the panel will turn off after 5 minutes of no activity.

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NOJA CONTROLLER - ACR (CONTINUED)

Selecting Alternative Active Group

At the Controller

1 Press the ‘On/Off’ button

2 Press the ‘Active Group’ button

Each button press will toggle between group 1, group 2, group 3 and group 4. The light will flash indicating which group has been selected.

3 When the desired setting is reached (flashing) Press the ‘Enter’ button. The above screen will display the settings selected

Active Group: Descriptions

1. Forward Power Flow – Normal
2. Alternate Forward Power Flow – Alternate feeder
3. Reverse Power Flow-
4. TFB Day Control – TFB/Code Red Declared

Disable Protection

Under some circumstances there may be a requirement to disable the protection on the ACR. This will make the ACR a Switching device only and will not detect any downstream fault.

At the controller

1 Press the ‘On/Off’ button

2 Press the ‘Protection’ button

The LED “Off” button will illuminate.

The ‘On/Off’ button does not need to be pressed again as the panel will turn off after 5 minutes of no activity.

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NOJA CONTROLLER - ACR (CONTINUED)

Mechanical Operation of ACR

1 Locate manual trip YELLOW ring located underneath the recloser.

Functions:

- When the yellow ring is pulled down the ring will mechanically open the ACR. The ACR does not need to be in local control to open via the yellow ring.
- When the ring is left down this prevents local and remote control of the ACR.
- When pushed up, this will allow local and remote operation of the ACR.
- The ACR can only be closed by using the control panel or by remote control.

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NULEC ACR ELECTRONIC CONTROL BOX

Prior to any operation:

- The ACR supervisory control must be suppressed before any local control can be achieved.
- Supervisory control must be suppressed for Electrical Access Permit issue.
- Confirm ACR location and labelling prior to operation.
- If the control panel display does not activate after pressing the PANEL ON/OFF pad, press the ➡ once.

Functions: Opening, Closing, Auto Reclose, Earth Fault Prot.
Rating: N/A
Insulant: N/A
Voltage: N/A

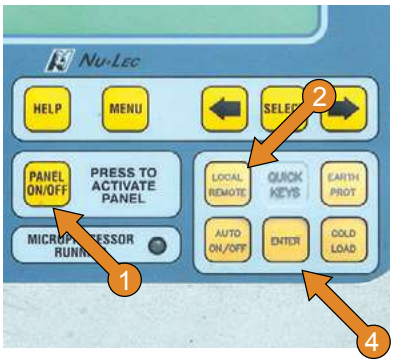
Suppression of the ACR Remote Control

1 Press the 'ON/OFF' pad to activate the display.

2 Press the 'LOCAL/REMOTE' pad. 'Remote Control On' will flash.

3 Press the 'LOCAL/REMOTE' pad again. The screen will flash 'Do Not Operate'. Press the 'LOCAL/REMOTE' pad again. The screen will flash 'Local Control On'

4 Press the 'ENTER' pad to accept the changed state. (i.e. supervisory control 'Off/Suppressed')



Note: *Supervisory control must be suppressed for Electrical Access Permit issue.*

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NULEC ACR ELECTRONIC CONTROL BOX (CONTINUED)

Closing ACR – Electrically

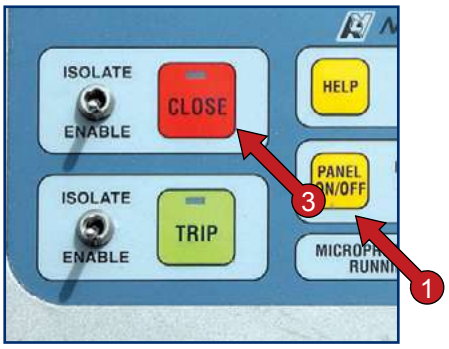
1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the ACR remote control. Refer to 'Suppression of ACR Remote Control' instruction.

3 Press the red 'CLOSE' pad to **CLOSE** the ACR.

4 Confirm semaphores agree with ACR status.

Notes: *If closing onto a de-energised line the 'Cold Load' option must be set. Refer to 'Selecting Cold Load Pickup' instruction.*
Auto reclose must be suppressed before closing ACR after lockout.



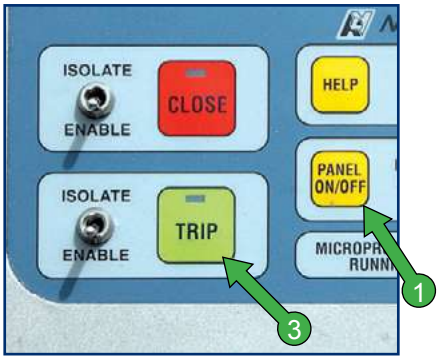
Opening ACR - Electrically

1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the ACR remote control. Refer to 'Suppression of ACR Remote Control' instruction.

3 Press the green 'TRIP' pad to **OPEN** the ACR.

4 Confirm semaphores agree with ACR status.



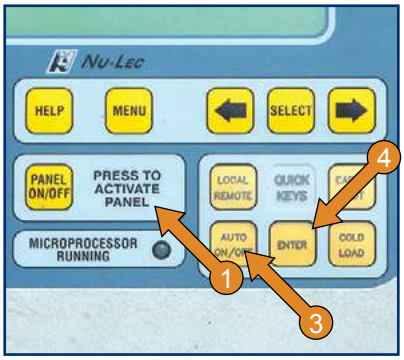
Suppressing of ACR Auto Reclose

1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the ACR remote control. Refer to 'Suppression of ACR Remote Control' instruction.

3 Press the 'AUTO ON/OFF' pad once - 'Reclose On' will flash on the screen. Press the pad again to change screen to read 'Reclose Off'.

4 Press the 'ENTER' pad to accept the changed state i.e. Reclose Suppressed.



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NULEC ACR ELECTRONIC CONTROL BOX (CONTINUED)

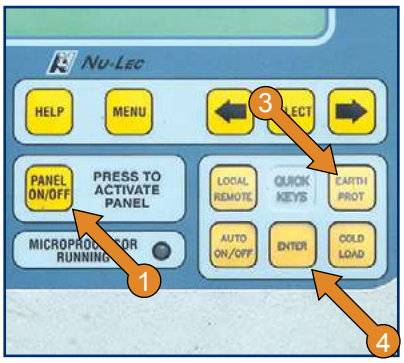
Suppressing of ACR Earth Leakage & Sensitive E/L Prot.

1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the ACR remote control. Refer to 'Suppression of ACR Remote Control' instruction.

3 Press the 'EARTH PROT' pad once - 'Earth Fault On & SEF On' will flash on the screen. Press the pad again to change screen to read 'Earth Fault Off & SEF Off'.

4 Press the 'ENTER' pad to accept the changed state i.e. Earth Fault & SEF off.



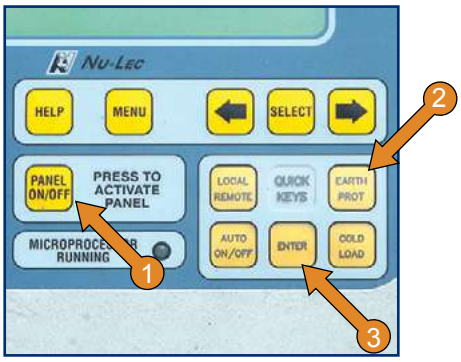
Note: *Earth Fault & Sensitive Earth Fault (SEF) protection must be suppressed prior to operating the ACR by-pass switch.*

Restorating of ACR Earth Leakage & Sensitive E/L Prot.

1 Press the 'ON/OFF' pad to activate the display.

2 Press the 'EARTH PROT' pad once - 'Earth Fault Off & SEF Off' will flash on the screen. Press the pad again and the Earth Fault component will change to 'Earth Fault On'. Press the pad again and the SEF component will change to 'SEF ON'.

3 Press the 'ENTER' pad to accept the changed state i.e. Earth Fault & SEF On.



Note: *Earth Fault & SEF protection must be restored separately. Earth Fault & Sensitive Earth Fault (SEF) protection must be suppressed prior to operating the ACR by-pass switch.*

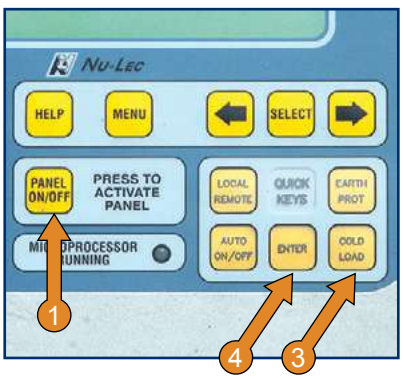
Selection of Cold Load Pickup

1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the ACR remote control. Refer to 'Suppression of ACR Remote Control' instruction.

3 Press the 'COLD LOAD' pad once - 'Cold Load Pickup' will flash on the screen. Press the pad again to change screen to read 'Cold Load Pickup On'.

4 Press the 'ENTER' pad to accept



Note: *If closing onto a de-energised line Cold Load Pickup should be selected.*

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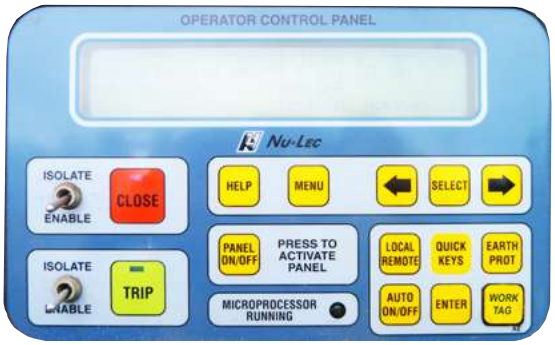
NULEC CAPM5 ELECTRONIC CONTROL BOX

Prior to any operation

- The 'COLD LOAD PICK UP' function on this control box is automatic.
- Only a local user can apply/remove the 'WORK TAG' when the Control Box is in the 'LOCAL' mode.
- Only a remote user can apply/remove the 'WORK TAG' when the Control Box is in the 'REMOTE' mode.
- The recloser cannot be closed by any means when the 'WORK TAG' is applied.
- Confirm the ACR location and labelling prior to operation.

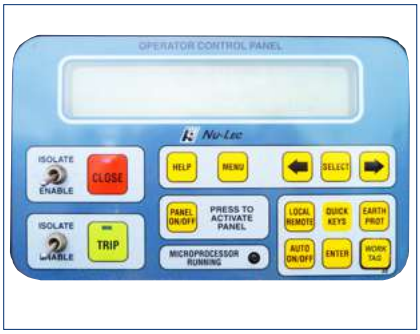
Functions: Open, Close, Electrical Local/ Remote, Fault Indicaton
Insulant: N/A
Voltage: N/A



Activating the Control Box Display

1 Press the 'ON/OFF' pad to activate the display – the 'TRIP FLAGS' screen will be displayed.

2 Push the ➡ button. The 'OPERATOR SETTINGS' screen will be displayed.



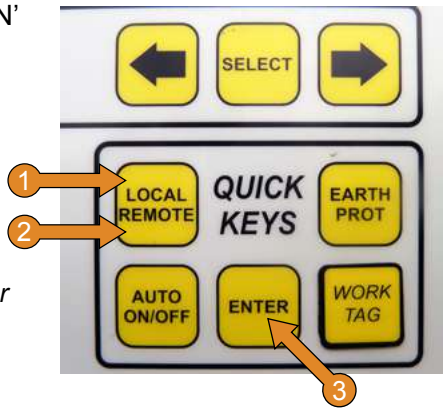
Suppressing the ACR Remote Control

1 Press the 'LOCAL/REMOTE' pad. 'REMOTE CONTROL ON' will be displayed.

2 Press the 'LOCAL/REMOTE' pad again. The screen will display 'LOCAL CONTROL ON'

3 Press the 'ENTER' pad to accept the changed state.

Note: *Supervisory control must be suppressed before any local control can be achieved. Supervisory control must be suppressed for electrical access permit issue.*



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NULEC CAPM5 ELECTRONIC CONTROL BOX (CONTINUED)

Suppressing the ACR Auto Reclose

1 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

2 Press the 'AUTO ON/OFF' pad once - 'Auto Reclose ON' will display on the screen. Press the pad again to change screen to read 'Auto Reclose OFF -Single Shot Active'.

3 Press the 'ENTER' pad to accept the changed state

Suppressing the ACR Earth Leakage & Sensitive E/L Prot.

1 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

2 Press the 'EARTH PROT' pad once - 'E/F ON / SEF ON' will be displayed on the screen. Press the pad again to change the screen to read 'E/F OFF / SEF OFF'.

3 Press the 'ENTER' pad to accept the changed state.

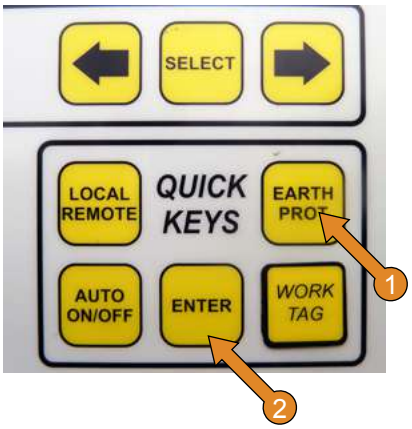
Note: *Earth Fault (E/F) & Sensitive Earth Fault (SEF) protection must be suppressed prior to operating the ACR by-pass switch.*

Restoring the ACR Earth Leakage & Sensitive E/L Prot.

1 Press the 'EARTH PROT' pad once - 'E/F OFF / SEF OFF' will display on the screen. Press the pad again and the Earth Fault component will change to 'E/F ON'. Press the pad again and the SEF component will change to 'SEF ON'.

2 Press the 'ENTER' pad to accept the changed state.

Note: *Earth Fault & SEF protection must be restored separately.*



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NULEC CAPM5 ELECTRONIC CONTROL BOX (CONTINUED)

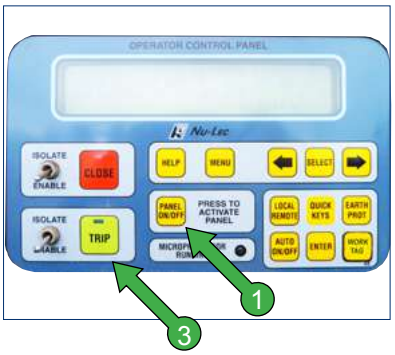
Opening the ACR – Local Electrically

1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

3 Press the yellow 'TRIP' pad to **OPEN** the ACR

4 Confirm the semaphores agree with the ACR status.



Closing the ACR – Local Electrical

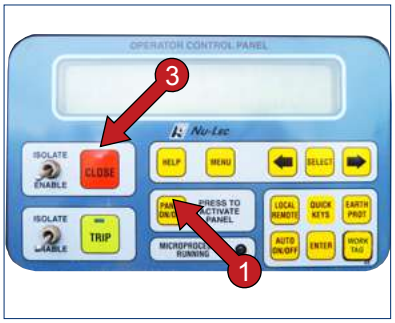
1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

3 Press the red 'CLOSE' pad to **CLOSE** the ACR.

4 Confirm the semaphores agree with the ACR status.

Note: *The Cold Load Pickup option is automatic on this control box. Auto Reclose must be suppressed prior to closing the ACR*



Applying the Work Tag Feature – Locally

1 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

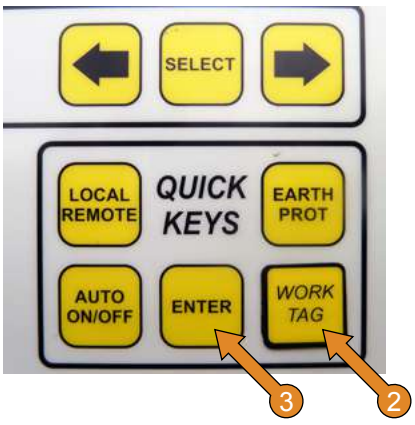
2 Press the 'WORK TAG' pad once - 'WORK TAG OFF' will be displayed on the screen. Press the pad again to change the screen to read 'WORK TAG APPLIED.

3 Press the 'ENTER' pad to accept the changed state.

4 Restore the ACR remote control.

Note: *If the Work Tag is applied locally and the ACR control is left in the LOCAL setting, the ACR cannot be closed remotely and the Work Tag cannot be removed remotely.*

Note: *To switch off the Work Tag, reverse the above instruction.*



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NULEC GAS SWITCH / SECTIONALISER

Prior to any operation:

- This electronic control box can be programmed to operate the gas switch as a sectionaliser. There are three (3) settings for the sectionaliser mode. They are as follows:
  - Sectionaliser on.
  - Sectionaliser off.
  - Sectionaliser one (1) shot to lockout.
- Confirm the Gas Switch/Sectionaliser location and labelling prior to operation.

Functions: Remote Electrical Open Close, Open Close Local Electric, Earth Fault Protection, Overcurrent Protection, Targets, Digital Readout

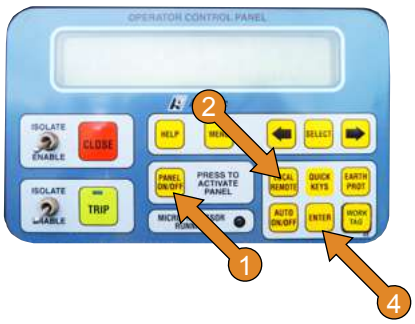
Suppressing the Gas Switch Remote Control

1 Press the ‘ON/OFF’ pad to activate the display.

2 Press the ‘LOCAL/REMOTE’ pad. ‘Remote Control On’ will flash.

3 Press the ‘LOCAL/REMOTE’ pad again. The screen will flash ‘Do Not Operate’. Press the ‘LOCAL/REMOTE’ pad again. The screen will flash ‘Local Control On’

4 Press the ‘ENTER’ pad to accept the changed state. (i.e. supervisory control ‘Off/Suppressed’).



Closing the Gas Switch / Sectionaliser – Electrical

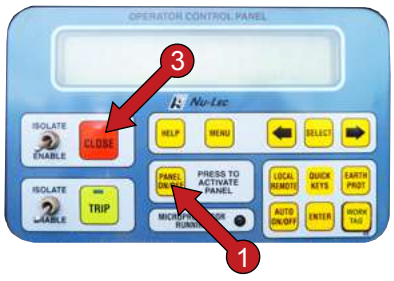
1 Press the ‘ON/OFF’ pad to activate the display.

2 Suppress the Gas Switch remote control. Refer to ‘Suppression of Gas Switch Remote Control’ instruction.

3 Press the red ‘CLOSE’ pad to **CLOSE** the Gas Switch / Sectionaliser.

4 Confirm the semaphores agree with the Gas Switch status.

Note: *If closing onto a de-energised line the ‘COLD LOAD’ option must be set.*



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NULEC GAS SWITCH / SECTIONALISER (CONTINUED)

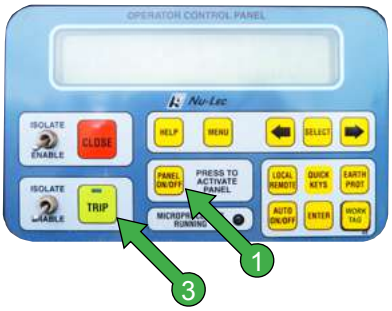
Opening the Gas Switch / Sectionaliser – Electrical

1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the Gas Switch remote control. Refer to 'Suppression of Gas Switch Remote Control' instruction.

3 Press the green 'TRIP' pad to OPEN the Gas Switch / Sectionaliser.

4 Confirm the semaphores agree with the Gas Switch status.



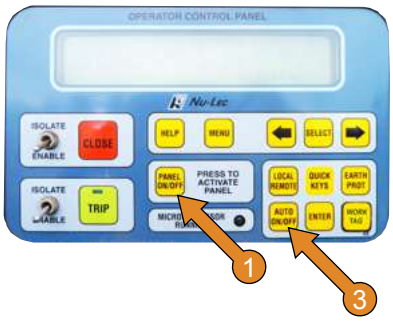
Sectionaliser Mode Selection

1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the Gas Switch remote control. Refer to 'Suppression of Gas Switch Remote Control' instruction.

3 Press the 'SECTION ON / OFF' pad once. The screen will read 'Sectionaliser On'. Pressing the pad again will change the screen to read 'Sectionaliser Off'. Pressing the pad again will change the screen to read 'One Shot To Lock Out'.

4 Press the 'ENTER' pad to accept the desired option. i.e Sectionaliser Off- One Shot To Lock Out.



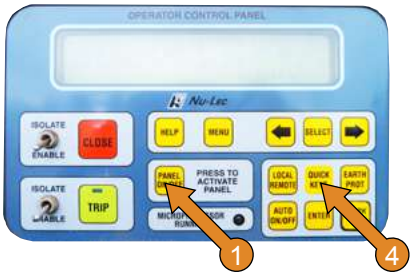
Resetting Targets

1 Press the 'ON/OFF' pad to activate the display.

2 Suppress the Gas Switch remote control. Refer to 'Suppression of Gas Switch Remote Control' instruction.

3 Read the screen and log all targets.

4 Press the 'RESET FAULT' pad to reset all targets.



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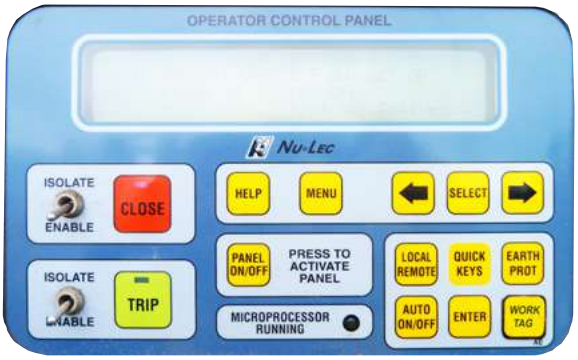
NULEC LOOP AUTOMATION ELECT CONTROL BOX

Prior to any operation

- Loop Automation Scheme maybe feeder or tie ACRs.
- Note: Switching the Control Box to 'LOCAL' does not disable the Loop Automation. If the Loop Automation feature is active ACRs may operate at any time.
- Note: Special access precautions apply for work on or adjacent to the Loop Automation Scheme. Refer to the Distribution Operations Procedures.
- If required, refer to the Nulec Control Box Operation Flow Chart template in this manual.
- The recloser cannot be closed by any means when the 'WORK TAG' is applied.
- Confirm the ACR location and labelling prior to operation.
- Confirm the Loop Automation status prior to any operation.

Functions: Push button Open Close, Earth Fault Protection, Auto Reclose, Digital Readout
Rating: N/A
Voltage: 22 kV



Activating the Control Box Display

1 Press the 'ON/OFF' pad to activate the display – the 'TRIP FLAGS' screen will be displayed.

2 Push the ➡ button. The 'LOOP AUTOMATION STATUS' screen will be displayed.

3 Push the ➡ button again. The 'OPERATOR SETTINGS' screen will be displayed.

Suppressing the ACR Remote Control

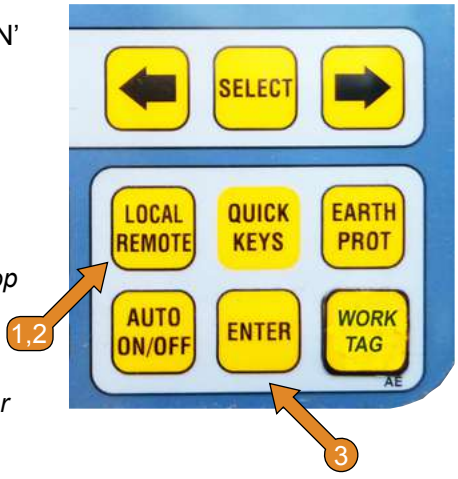
1 Press the 'LOCAL/REMOTE' pad. 'REMOTE CONTROL ON' will be displayed.

2 Press the 'LOCAL/REMOTE' pad again. The screen will display 'LOCAL CONTROL ON'

3 Press the 'ENTER' pad to accept the changed state.

Caution: *Suppression of the remote control does not disable the Loop Automation Scheme.*

Note: *Supervisory control must be suppressed before any local control can be achieved. Supervisory control must be suppressed for electrical access permit issue.*



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NULEC LOOP AUTOMATION ELECT CONTROL BOX (CONTINUED)

Disabling the Loop Automation Scheme – Local

1 Suppress the ACR remote control. Refer to the 'Suppression of the ACR Remote Control' instruction.

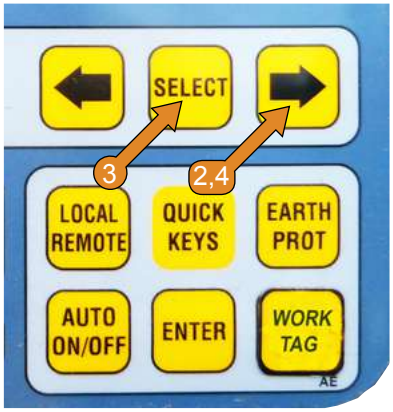
2 From the 'TRIP FLAGS' screen press the ➡ button. The 'LOOP AUTOMATION STATUS' screen will be displayed.

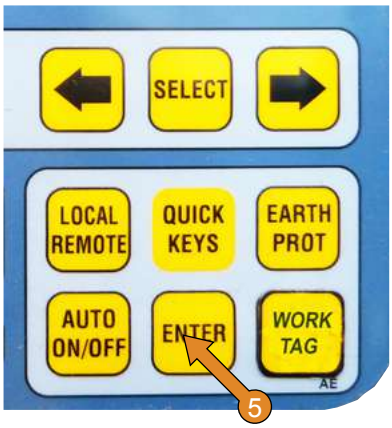
3 Press the 'SELECT' pad. The screen will display 'LOOP AUTO ON' flashing.

4 Press the ➡ button. The screen will display 'LOOP AUTO OFF' and the date will be displayed.

5 Press the 'ENTER' pad to accept the changed state.

6 A message will also be displayed stating that the Loop Automation Scheme must be ON for automatic operation.





Notes: *The Loop Automation Scheme can be disabled via SCADA from the Control Room. This is the preferred method of disabling the Loop Automation Scheme.*

The Loop Automation Scheme must be disabled for Electrical Access Permit considerations. Other precautions also apply - Refer to the Distribution Operations Procedure 07-M200 for further details.

All ACRs in the Loop Automation Scheme should be disabled. Refer to the Control Room for details if required.

Enabling the Loop Automation Scheme - Local

1 Suppress the ACR remote control. Refer to the 'Suppression of the ACR Remote Control' instruction.

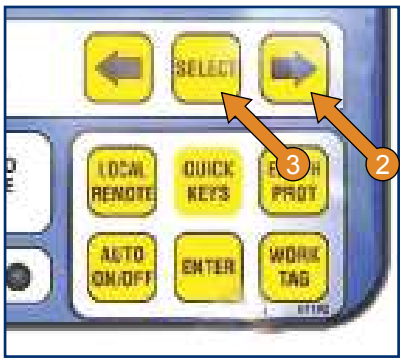
2 From the 'TRIP FLAGS' screen press the ➡ button. The 'LOOP AUTOMATION STATUS' screen will display 'LOOP AUTO OFF' - Feeder or Tie ACR - Date turned OFF.

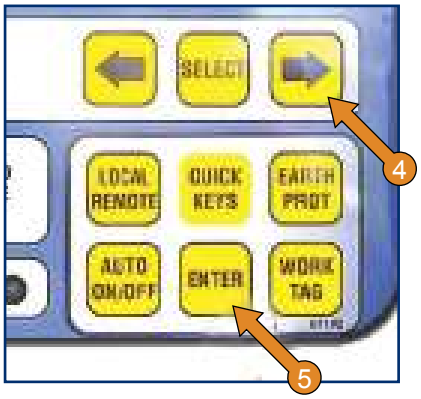
3 Press the 'SELECT' pad. The screen will display 'LOOP AUTO OFF' flashing.

4 Press the ➡ button. The screen will display 'LOOP AUTO ON'.

5 Press the 'ENTER' pad to accept the changed state.

6 A message will also be displayed stating 'LOOP AUTOMATION NORMAL'.





Note: *The Loop Automation Scheme can be enabled via SCADA from the Control Room. This is the preferred method of disabling the Loop Automation Scheme.*
All ACRs in the Loop Automation Scheme should be enabled. Refer to the Control Room for details if required.

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NULEC LOOP AUTOMATION ELECT CONTROL BOX (CONTINUED)

Closing the ACR Electrically - Local

1 Confirm the Loop Auto status.

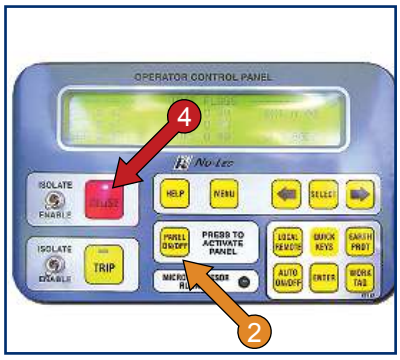
2 Press the 'ON/OFF' pad to activate the display.

3 Suppress the ACR remote control. Refer to the 'Suppression of the ACR Remote Control' instruction.

4 Press the red 'CLOSE' pad to CLOSE the ACR

5 Confirm semaphores agree with the ACR status.

Note: *The Auto Reclose must be suppressed prior to closing the ACR. The Cold Load Pickup option is automatic on this control box.*



Opening the ACR Electrically - Local

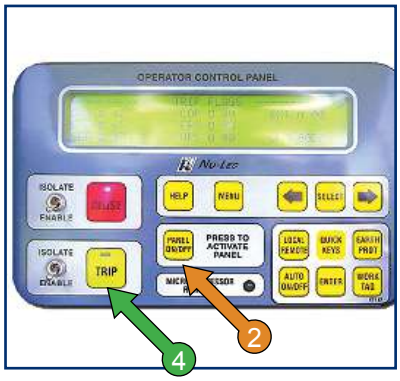
1 Confirm the Loop Auto status.

2 Press the 'ON/OFF' pad to activate the display.

3 Suppress the ACR remote control. Refer to the 'Suppression of the ACR Remote Control' instruction.

4 Press the Green 'TRIP' pad to OPEN the ACR

5 Confirm semaphores agree with the ACR status



Supressing the ACR Auto Reclose

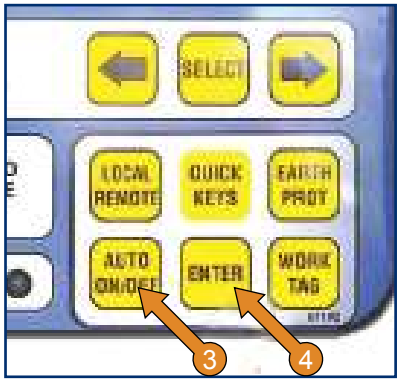
1 Confirm the Loop Auto status.

2 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

3 Press the 'AUTO ON/OFF' pad once - 'Auto Reclose ON' will display on the screen. Press the pad again to change screen to read 'Auto Reclose OFF -Single Shot Active'.

4 Press the 'ENTER' pad to accept the changed state.

Note: *The Auto Reclose must be suppressed prior to closing the ACR electrically - local.*



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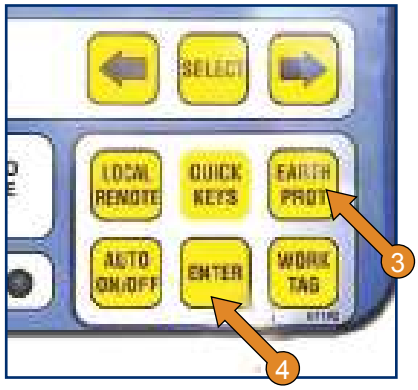
NULEC LOOP AUTOMATION ELECT CONTROL BOX (CONTINUED)

Suppressing the ACR Earth Leakage & Sensitive E/L Prot.

Note: *Earth Fault (E/F) & Sensitive Earth Fault (SEF) protection must be suppressed prior to operating the ACR by-pass switch.*



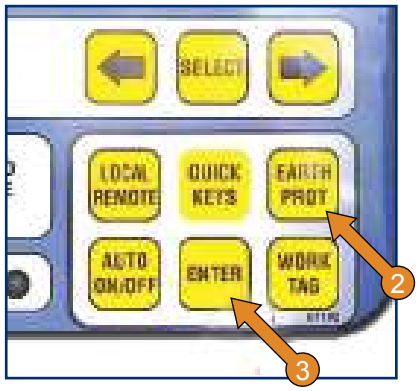
1 Confirm the Loop Auto status.

2 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

3 Press the 'EARTH PROT' pad once - 'E/F ON / SEF ON' will be displayed on the screen. Press the pad again to change the screen to read 'E/F OFF / SEF OFF'.

4 Press the 'ENTER' pad to accept the changed state.

Restoring the ACR Earth Leakage & Sensitive E/L Prot.



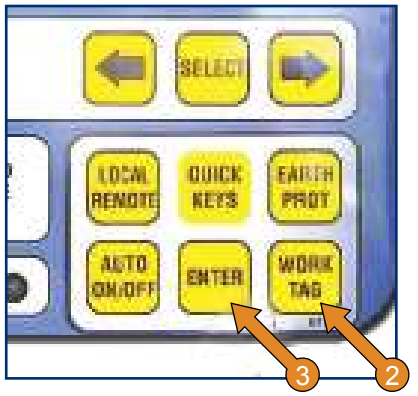
1 Confirm the Loop Auto status.

2 Press the 'EARTH PROT' pad once - 'E/F OFF / SEF OFF' will display on the screen. Press the pad again and the Earth Fault component will change to 'E/F ON'. Press the pad again and the SEF component will change to 'SEF ON'.

3 Press the 'ENTER' pad to accept the changed state.

Note: *Earth Fault & SEF protection must be restored separately.*

Applying the Work Tag Feature – Locally



1 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

2 Press the 'WORK TAG' pad once - 'WORK TAG OFF' will be displayed on the screen. Press the pad again to change the screen to read 'WORK TAG APPLIED.

3 Press the 'ENTER' pad to accept the changed state.

4 Restore the ACR remote control.

Note: *If the Work Tag is applied locally and the ACR control is left in the LOCAL setting the ACR cannot be closed remotely and the Work Tag cannot be removed remotely.*

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NULEC LOOP AUTOMATION ELECT CONTROL BOX (CONTINUED)

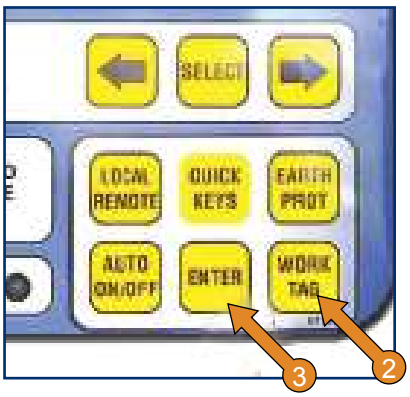
Switching off the Work Tag Feature - Locally

1 Suppress the ACR remote control. Refer to 'Suppression of the ACR Remote Control' instruction.

2 Press the 'WORK TAG' pad once - 'WORK TAG APPLIED' will be displayed on the screen. Press the pad again to change the screen to read 'WORK TAG OFF.

3 Press the 'ENTER' pad to accept the changed state.

4 Restore the ACR remote control.



Note: *If the Work Tag is applied locally and the ACR control is left in the LOCAL setting the ACR cannot be closed remotely and the Work Tag cannot be removed remotely.*

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QEI CAPACITOR CONTROL BOX

Prior to any operation:

- Confirm the capacitor units are fit for service prior to and after operation.
- Ensure all three capacitor vacuum switches have operated correctly.
- The capacitor bank vacuum switches cannot be closed for app. five (5) minutes after being opened.
- Confirm the control box location and labelling prior to operation.
- Ensure all three vacuum switches have opened correctly.

Functions:	Opening, Closing, Auto Reclose, Earth Fault Prot.
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Opening the Capacitor Vacuum Switches

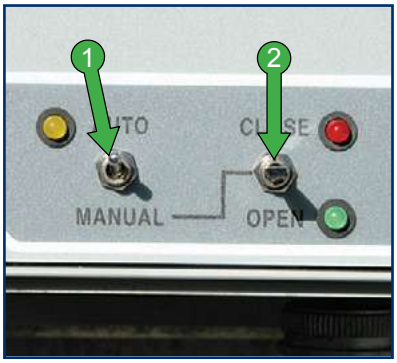
1 Switch the AUTO / MANUAL toggle switch to the MANUAL position.

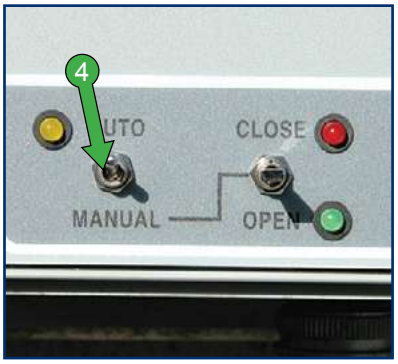
2 Lower the CLOSE / OPEN toggle switch to the OPEN position. Wait approx seven (7) seconds for the vacuum switches to trip.

3 Confirm the three vacuum switches have opened correctly.

4 Switch the AUTO/MANUAL toggle switch to the AUTO position as shown.

Note:If *an Access Permit is to be issued then the AUTO / MANUAL toggle switch must remain in the MANUAL position.*





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QEI CAPACITOR CONTROL BOX (CONTINUED)

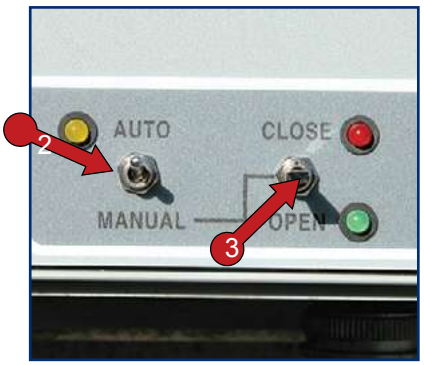
Closing the Capacitor Vacuum Switches

1 Open the control box access door.

2 Switch the AUTO / MANUAL toggle switch to the MANUAL position.

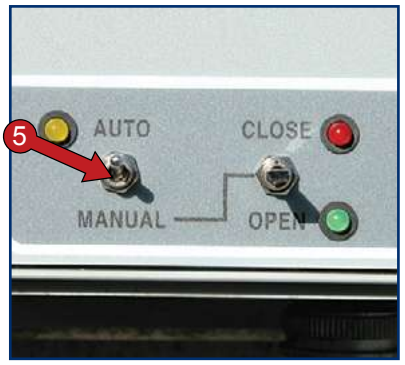
3 Raise the CLOSE / OPEN toggle switch to the CLOSE position. Wait app. one (1) minute for the vacuum switches to **CLOSE**.

4 Confirm all three vacuum switches have closed correctly.



5 Switch the AUTO / MANUAL toggle switch to the AUTO position.

6 Close the control box access door.



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S&C INTELLICAP PLUS CAPACITOR CONTROL BOX

Prior to operation:

- This control box controls the ABB Pole Top Capacitors.
- Confirm the capacitor units are fit for service prior to and after any operation.
- Ensure all three capacitor vacuum switches have operated correctly.
- Note: The capacitor bank vacuum switches cannot be closed for app. five (5) minutes after being opened.
- Note: The 'OPERATION MODE' must be set to 'MANUAL' prior to any operation of the capacitor bank HV fuses.
- Confirm the control box location and labelling prior to operation.
- Confirm Oil Levels Gas Pressure Labeling Semaphores

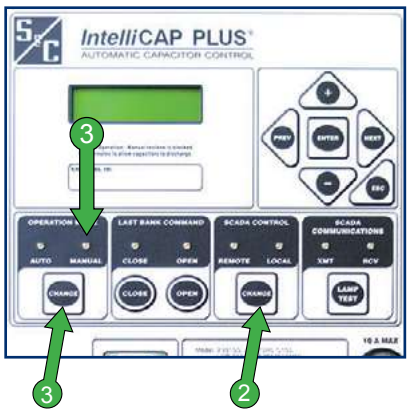
Operation Options:	Local Electrical, Opening/ Closing – Local Electrical
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Opening the Capacitor Vacuum Switches

1 Unlock and open the control box access door.

2 Press the 'SCADA CONTROL' 'CHANGE' button to switch the control to 'LOCAL' and confirm the red 'LOCAL' LED illuminates.

3 Press the 'OPERATIONAL MODE' 'CHANGE' button to to switch the control to 'MANUAL' and confirm the red 'MANUAL' LED illuminates.



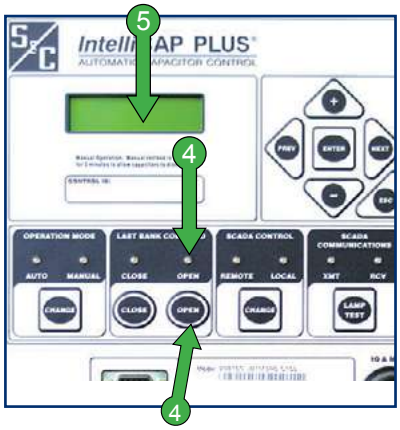
Note: *The open sequence can be cancelled by momentarily changing the 'OPERATION MODE' to the 'AUTO' position then returning to the 'MANUAL' position.*

4 Press the 'LAST BANK COMMAND' 'OPEN' button and confirm the red 'OPEN' LED illuminates – blinking rapidly.

5 Confirm countdown to open sequence on the LCD display - (open in 30 seconds).

6 Move away from the capacitors until opened.

7 Confirm all three (3) capacitor module CBs have opened and the 'OPEN' LED ceases blinking.



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S&C INTELLICAP PLUS CAPACITOR CONTROL BOX (CONTINUED)

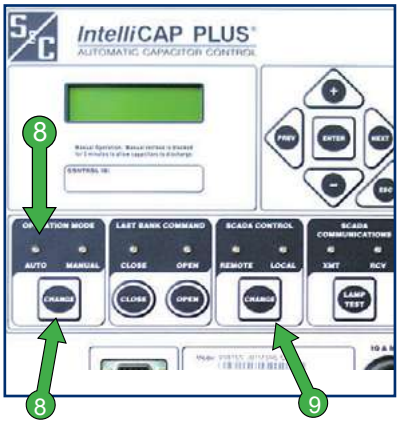
8 Press the 'OPERATIONAL MODE' 'CHANGE' button to to switch the control to 'AUTO' and confirm the red 'AUTO' LED illuminates.

9 Press the 'SCADA CONTROL' 'CHANGE' button to switch the control to 'REMOTE' and confirm the red 'REMOTE' LED illuminates.

10 Close and lock the control box access door.

Note: *Ensure all three vacuum switches have opened correctly.*

Note: *If an Access Permit is to be issued then the OPERATION MODE must remain in the MANUAL position.*



Closing the Capacitor Vacuum Switches

1 Unlock and open the control box access door.

2 Press the 'SCADA CONTROL' 'CHANGE' button to switch the control to 'LOCAL' and confirm the red 'LOCAL' LED illuminates.

3 Press the 'OPERATIONAL MODE' 'CHANGE' button to to switch the control to 'MANUAL' and confirm the red 'MANUAL' LED illuminates.

Note: *The close sequence can be cancelled by momentarily changing the 'OPERATION MODE' to the 'AUTO' position then returning to the 'MANUAL' position.*

4 Press the 'LAST BANK COMMAND' 'CLOSE' button and confirm the red 'CLOSE' LED illuminates – blinking rapidly.

5 Confirm countdown to close sequence on the LCD display - (close in 30 seconds).

6 Move away from the capacitors until closed.

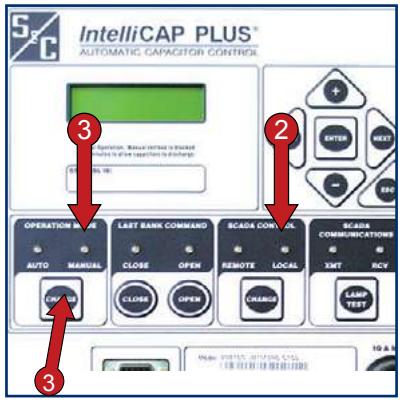
7 Confirm all three (3) capacitor module CBs have closed and the 'CLOSE' LED ceases blinking.

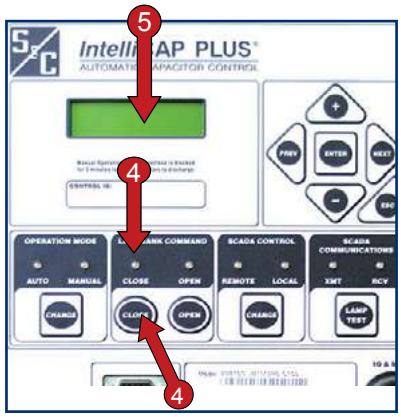
8 Press the 'OPERATIONAL MODE' 'CHANGE' button to to switch the control to 'AUTO' and confirm the red 'AUTO' LED illuminates.

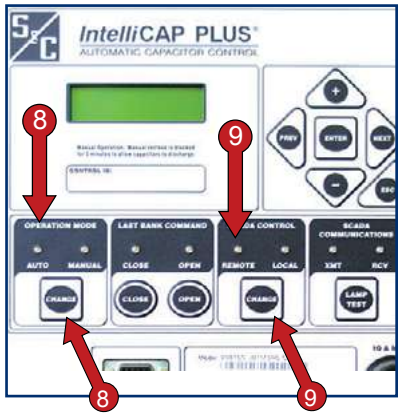
9 Press the 'SCADA CONTROL' 'CHANGE' button to switch the control to 'REMOTE' and confirm the red 'REMOTE' LED illuminates.

10 Close and lock the control box access door.

Note: *Ensure all three vacuum switches have closed correctly.*







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SIEMENS PORTABLE MID SPAN GANGED SWITCH

Prior to any operation:

- Identified by orange coloured head.
- Ensure all 3 units are communicating with each other via Bluetooth.

  Note: This device cannot be used as an isolation point - inline HV isolators or G&B work methods must be used to create an isolation point.

  When installed on 2 wire HV networks, the third unit must be positioned in close proximity so it can be detected (Bluetooth) by other units.

  The uninstalled third unit must be safely secured in a controlled environment as it will open and close in coordination with the two installed units

- 60 second Opening and Closing sequence can be stopped during sequence.

Functions:	Load Break Opening & Closing
Rating:	400A
Insulant:	Vacuum Interrupter
Voltage:	27kV

Manually Opening the Units (GREEN)

1 Press one of the Green levers up with an operating stick.

2 Red LED will flash for approx 3-4 seconds then flash every 2 seconds. Wait and the other 2 units will start flashing every 2 seconds which indicates that they are all synced. A 60 second time period will commence then all 3 units will Open.

3 Move away from units during 60 second period.

4 The semephore will change to Green on all 3 units after the 60 seconds and all units will be Open.

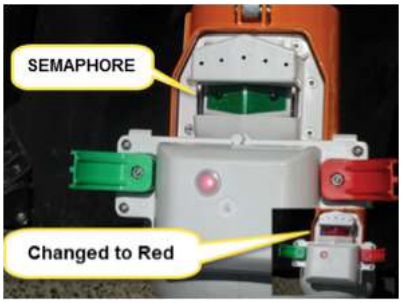
Manually Closing the Units (RED)

1 Press one of the Red levers up with an operating stick.

2 Red LED will flash for approx 3-4 seconds then flash every 2 seconds. Wait and the other 2 units will start flashing every 2 seconds which indicates they are all synced. A 60 second time period will commence then all 3 units will Close.

3 Move away from units during 60 second period.

4 The semaphore will change to Red on all 3 units after the 60 seconds and all units will be Open.



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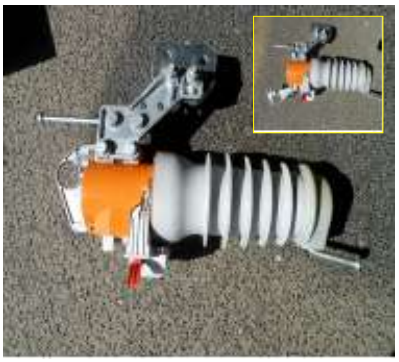
SIEMENS PORTABLE MID SPAN GANGED SWITCH (CONTINUED)

Overriding the Opening or Closing Sequence



1 Place the operating stick into the external lever and gently pull down on all 3 units.

2 Once all 3 levers are in the down position, the opening or closing sequence will be stopped during the 60 second opening/closing sequence on al units.

3 To enable units again, gently press up external lever on all 3 units.

Note: *During the Opening or Closing process if the LED's on each unit are not flashing, stop the process by gently pulling down on the external levers on each unit. Then place external lever on each unit back into the latched closed position again and start the Opening or Closing process again.*

Inserting or Replacing the Control Module

1 Disable the Opening and Closing sequence as described above.

2 Pull the control module straight down with the adaptor stick or G&B methods.

3 Replace with new control module by gently pushing up into position and align with the 3 pins. (See Inset).

4 Enable opening/closing by gently pushing the external lever up.

Note: *Remove and replace all control modules as they will need to re-establish communication and pair up prior to being operated again (Approx. 2 minute wait)*

Checking Control Module Battery Life

1 Prior to installation of the Portable Ganged Switch, take the control module out of each unit.

2 Press both Green and Red levers at the same time.

3 The LED flashes brightly once and then flashes rapidly while the test is underway. At the end of the test the LED will blink in a sequence from 5 to 0 times to indicate the battery level.

Number of Blinks	Means
No Blink	Totally flat battery. (FAIL. DO NOT USE.)
1 Blink	Very low battery. (FAIL. DO NOT USE.)
2 Blinks	Battery very low and nearing end of life.
3 Blinks	Battery ok
4 Blinks	Battery well charged
5 Blinks	Battery fully charged.

Repeat for each Control Module unit.

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SCHNEIDER NULEC ADVC2 ELECTRONIC CONTROL BOX

Prior to any operation

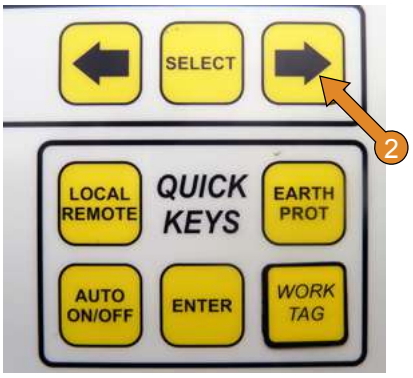
- Confirm the ACR is fit for service prior to and after any operation.
- Note: Opening the access door activates the control box panel.
- Note: When activated the control panel LCD will firstly display the ACR name and location followed by the TRIP FLAGS screen.
- The 'LOOP AUTOMATION' scheme (if fitted) can only be disabled via SCADA from the Control Room.
- The recloser cannot be closed by any means when the 'WORK TAG' is applied.
- Confirm the ACR location and labelling prior to any operation.

Functions:	Remote Electrical Open Close, Push Button Open Close, Earth Fault Protection, Auto Reclose, Digital Readout
Insulant:	N/A
Voltage:	22 kV

Confirming the Operator Setting Status

1 Opening the access door activates the Control Box panel and automatically defaults to the TRIP Flag screen.

2 Press the ➡ pad to display the Operator Settings Status screen.



Suppressing the ACR Remote Control

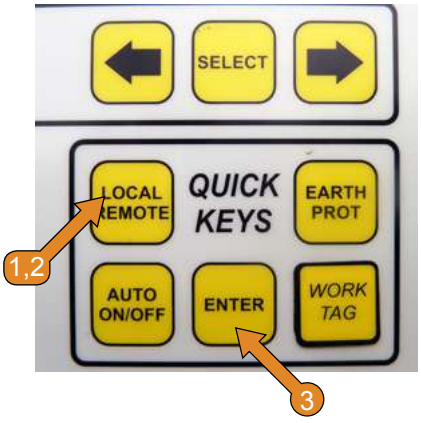
1 Press the LOCAL REMOTE pad - `Remote Control ON` will flash

2 Press the LOCAL REMOTE pad - `LOCAL CONTROL ON` will flash.

3 Press the ENTER pad to accept the change.

Note: *Supervisory control must be suppressed before any local control can be achieved.*

Supervisory control must be suppressed for Electrical Access Permit issue.



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SCHNEIDER NULEC ADVC2 ELECTRONIC CONTROL BOX (CONTINUED)

Restoring the ACR Remote Control

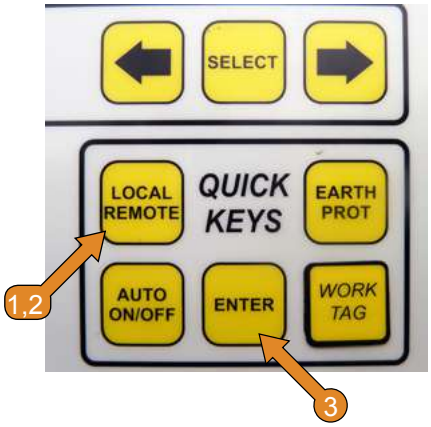
1 Press the LOCAL REMOTE pad - `LOCAL CONTROL ON` will flash.

2 Press the LOCAL REMOTE pad - `Remote Control ON` will flash.

3 Press the ENTER pad to accept the changed state.

Note: *Supervisory control must be suppressed before any local control can be achieved.*

Supervisory control must be suppressed for electrical access permit issue.



Suppressing the ACR Auto Reclose

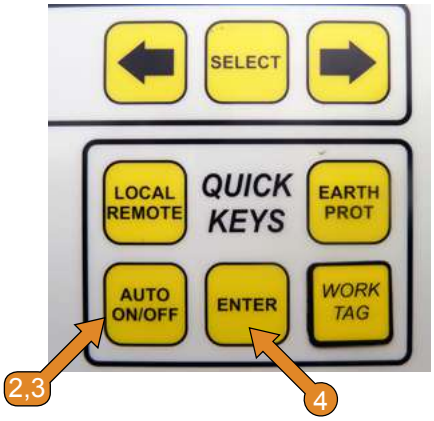
1 Confirm the ACR remote control is suppressed.

2 Press the AUTO ON/OFF pad - `Auto Reclose ON` will flash.

3 Press the AUTO ON/OFF pad - `Auto Reclose OFF` will flash.

4 Press the ENTER pad to accept the changed state
`Auto Reclose OFF`
`Single Shot Active` will be displayed.

Note: *The auto reclose must be suppressed prior to closing the ACR locally.*

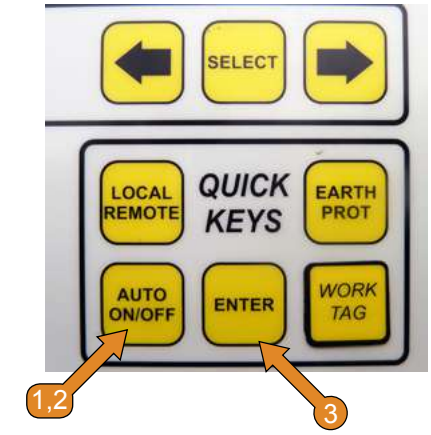


Restoring the ACR Auto Reclose

1 Press the AUTO ON/OFF pad - `Auto Reclose OFF` `Single Shot Active` will flash.

2 Press the AUTO ON/OFF pad - `Auto Reclose ON` will flash.

3 Press the ENTER pad to accept the changed state.



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SCHNEIDER NULEC ADVC2 ELECTRONIC CONTROL BOX (CONTINUED)

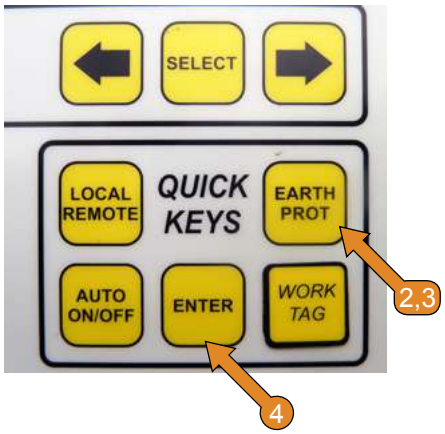
Suppressing the Earth Fault & Sensitive Earth Fault Prot.

1 Confirm the ACR remote control is suppressed.

2 Press the EARTH PROT pad- `E/F ON, SEF ON` will flash.

3 Press the EARTH PROT pad- `E/F OFF, SEF OFF` will flash.

4 Press the ENTER pad to accept the changed state.



Restoring the Earth Fault & Sensitive Earth Fault Prot.

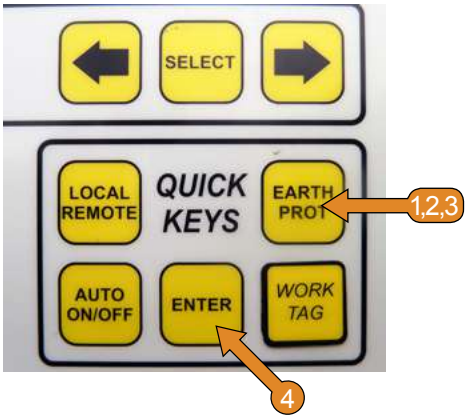
1 Press the EARTH PROT pad - `E/F OFF, SEF OFF` will flash.

2 Press the EARTH PROT pad - `E/F ON, SEF OFF` will flash.

3 Press the EARTH PROT pad - `E/F ON, SEF ON` will flash.

4 Press the ENTER pad to accept the changed state.

Note: *The EIF and SEF protection must be restored separately.*



Enabling the ACR Work Tag Function

1 Confirm the ACR remote control is suppressed.

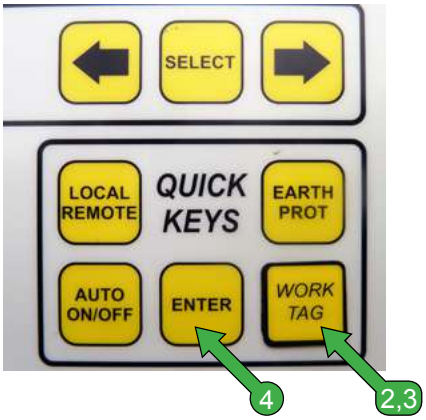
2 Press the WORK TAG pad - `Work Tag OFF` will flash.

3 Press the WORK TAG pad - `Work Tag Applied` will flash.

4 Press the ENTER pad to accept the changed state - the Operator Settings screen will flash `Warning – Work Tag Applied`

Note: *When the Work Tag function is enabled the following ACR settings are applied:*

- *Instant 0/C Trip*
- *EIF Trip- 0.05 Seconds*
- *SEF- 0.8 Seconds*
- *Auto Reclose Suppressed*
- *The ACR can be tripped but NOT closed.*



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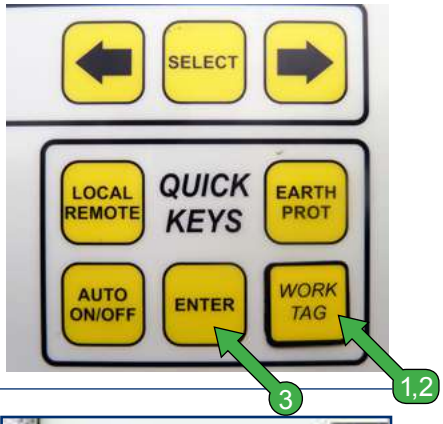
SCHNEIDER NULEC ADVC2 ELECTRONIC CONTROL BOX (CONTINUED)

Disabling the ACR Work Tag Function

1 Press the WORK TAG pad - `Work Tag Applied` will flash.

2 Press the WORK TAG pad - `Work Tag OFF` will flash.

3 Press the ENTER pad to accept the changed state.



Opening the ACR – Local Electrically

1 Confirm the ACR remote control is suppressed.

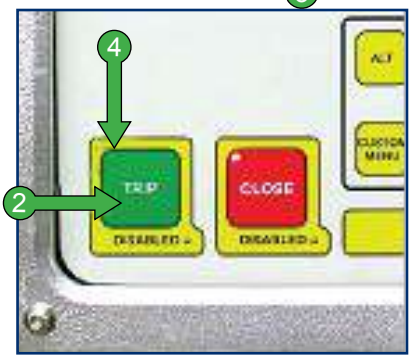
2 Press TRIP DISABLED pad to **OPEN** the ACR

3 The Operator Settings screen will display `Lockout`

4 Confirm the 'TRIP' LED illuminates.

5 Confirm the ACR semaphore indicates 'OPEN'

Note: *The ACR can be tripped locally regardless of the status of the remote control – 'ON' or 'OFF'. The ACR cannot be closed locally unless the remote control is suppressed – 'OFF'.*



Closing the ACR – Local Electricity

1 Confirm the ACR remote control is suppressed

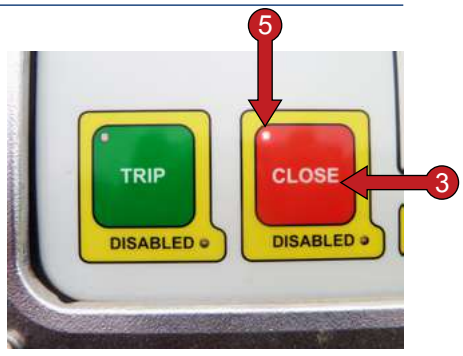
2 Confirm the ACR auto reclose is suppressed.

3 Press the CLOSE DISABLED pad to **CLOSE** the ACR.

4 The Operator Settings screen will display `Single Shot Active`.

5 Confirm the 'CLOSE' LED illuminates.

6 Confirm the ACR semaphore indicates 'CLOSED'



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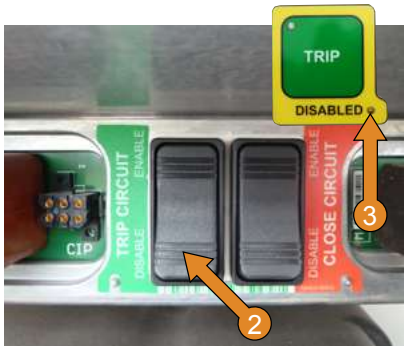
SCHNEIDER NULEC ADVC2 ELECTRONIC CONTROL BOX (CONTINUED)

Isolating the ACR Trip Circuit



1 Confirm the ACR remote control is suppressed.

2 Press the ‘TRIP CIRCUIT’ ‘DISABLE’ switch to isolate the trip circuit.

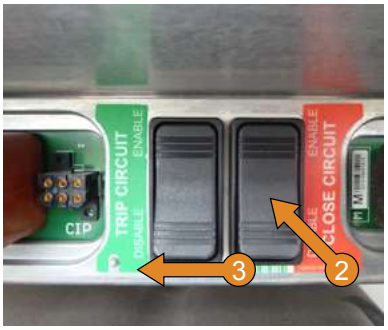
3 Confirm the ‘DISABLED’ LED illuminates.

4 The Operator Settings screen will flash:
`Trip Circuit is Disconnected`

To restore the trip circuit press the ‘TRIP CIRCUIT ‘ENABLE’ switch and confirm the ‘DISABLED’ LED is off.

Note: *Isolating the trip circuit places a physical break in the circuit. All operator settings remain unaffected.*

Isolating the ACR Close Circuit



1 Confirm the ACR remote control is suppressed.

2 Press the ‘CLOSE CIRCUIT’ ‘DISABLE’ switch to isolate the close circuit.

3 Confirm the ‘DISABLED’ LED illuminates.

4 The Operator Settings screen will flash
`Close Circuit is Disconnected`

To restore the close circuit press the ‘CLOSE CIRCUIT ‘ENABLE’ switch and confirm the ‘DISABLED’ LED is off.

Note: *Isolating the close circuit places a physical break in the circuit. All operator settings remain unaffected.*

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SCHNEIDER NULEC W SERIES REMOTE CONTROLLED SWER ACR

Prior to any operation

- There is no Earth Leakage on these units.
- Electrical operation is the preferred method of operation on these SWER ACR's
- Please refer to the Schneider Nulec ADVC 2 Electronic control box in the Control Boxsection of this manual for electronic operation.
- Confirm HV switch location and labelling prior to operation.
- Ensure the ACR Auto Reclose is suppressed prior to closing the By-pass fuse.

Functions: Auto Reclose, Opening, Closing,
Rating 24kV
Insulant: Vacuum Interupter
Voltage: 12.7 kV

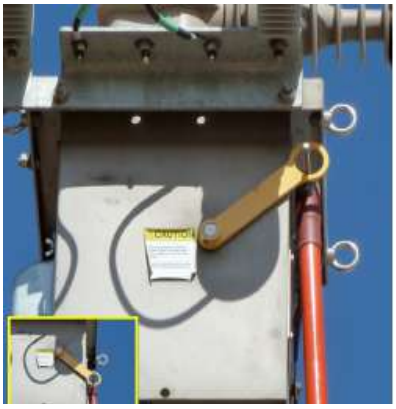
Opening ACR Manually (Use only if control box has failed)

1 Place the HV operating stick into the yellow operating lever as shown.

2 To OPEN ACR gently pull down on the yellow lever quickly and firmly untill it stops (inset)

3 Confirm the semaphore points to the "O" (open) position.

4 Once opened slowly push the manual operating handle to the up position. If the manual handle is left slightly in the down position it will make the electronic closing in-operable.



Note: *You CANNOT close the ACR via the manual operating handle. Closing must be done via the electronic control box.*

SCHNEIDER NULEC W SERIES REMOTE CONTROLLED SWER ACR

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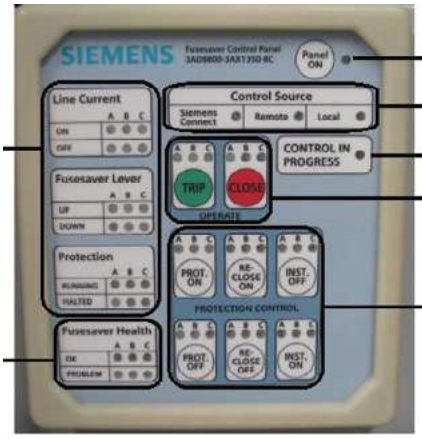
SIEMENS REMOTE FUSESAVER CONTROL UNIT

Functions: Opening, Closing, Auto-reclose Suppression
Insulant: N/A
Voltage: 22 kV

Prior to any operation:

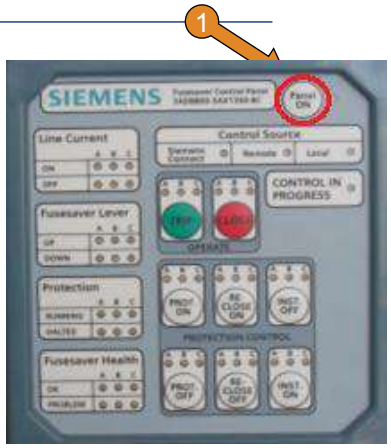
- The Fusesaver Control Panel is fitted inside the RCU enclosure and can be accessed by the operator when the RCU door is open.
- It is very important that the field operators be trained and familiar with the different indications, their meaning and functions before operating the unit. All anomalies must be reported to and rectified before operating.
- Do not operate the unit while 'Control in progress' indicator is flashing.
- As practicable, check and confirm the status of the indications on the unit and the fiscal status of the Feeder, Fuses and Fusesavers before operating.



Turning the Contol Panel On and Off

1 To turn the Control Panel on press the Power on button, circled in red.

Note: *Ensure that the isolation switch behind the Radio tray is switch on.*



2 Panel lights should come on.

Note *that the Control Source indication LED's indication is on for Remote and Local control. The reason for this is that the unit can be operated Locally even if the unit is in Remote mode.*

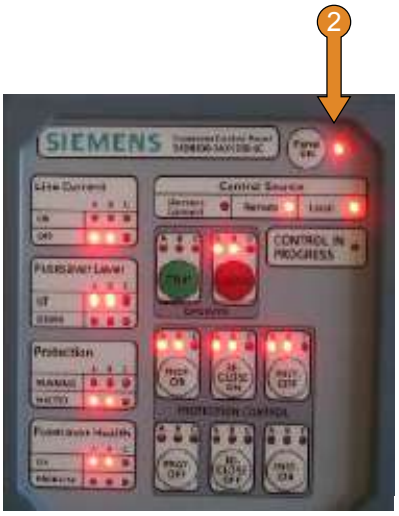
3 LED's for the units A, B & C will indicate the status of the FuseSavers. This is an example of the indications one could expect to find.

4 The illustration is for a single phase configured unit. All three lights A, B & C should light up for a three phase configured unit.

5 Turn power on for operating and off when work complete.

6 DO NOT LEAVE THE PANEL POWER ON

Note: *The LED indication will depend on actual Fusesaver status*



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SIEMENS REMOTE FUSESAVER CONTROL UNIT (CONTINUED)

Turning Remote Control Off & On

The Unit CAN be operated locally with remote on so ensure that remote is turned off when operating locally.

1 Turn off remote control

2 Switch the remote toggle switch to the OFF position – circled in red

3 The Unit should display the following indication

LED display indication:

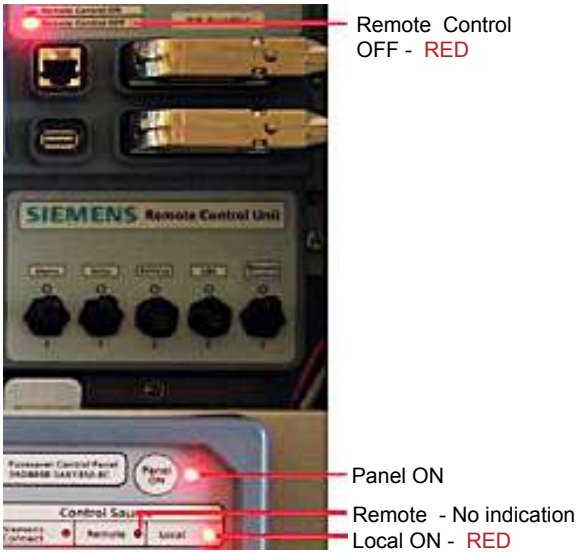
Remote Control OFF – red

4 FuseSaver Control Panel – Control Source:

Panel ON

Local – ON - **red**

Remote – no indication



Turn On Remote Control

1 Switch the remote toggle switch to the ON position

The display should return to:

LED display indication:

Remote Control ON – green

FuseSaver Control Panel – Control Source:

Panel ON – red

Local – ON – red

Remote – ON – red

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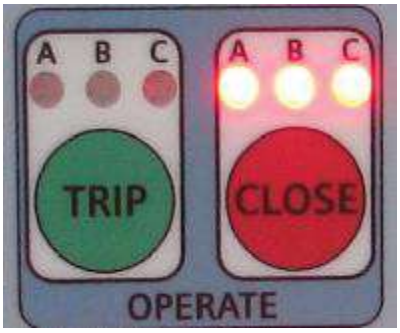
SIEMENS REMOTE FUSESAVER CONTROL UNIT (CONTINUED)

Local Operation



Trip/Close Status & Controls

LED solid: FuseSaver in closed position
LED flashing: FuseSaver Close Control in Progress

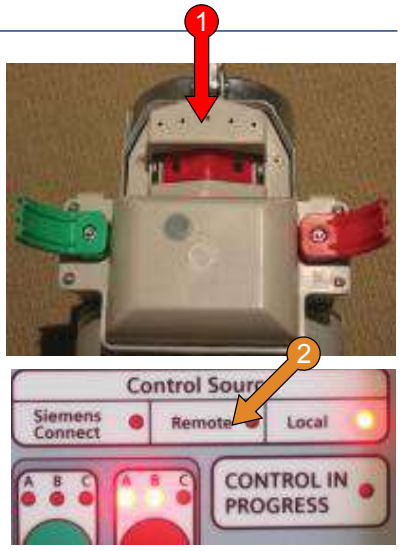
The Trip button will issue Ganged Trip control to all FuseSavers on the line. The Close button will issue a Ganged Close control to all FuseSavers on the line.

How to Trip the FuseSavers

1 Check FuseSaver status, this can be done by physically checking the FuseSaver indication, eg. Indicator RED closed

2 Turn OFF Remote Control

3 Push the Trip button

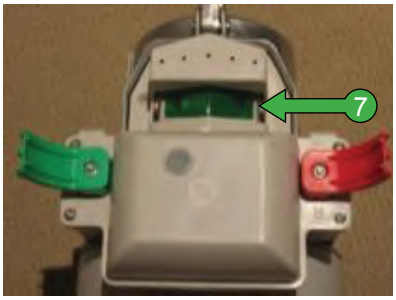


4 “Control in Progress” will flash Trip & Close LED’s will flash

5 The Control in Progress & Close LED’s stop flashing, indicating operation complete

6 Trip LED’s change to Solid state indicating the FuseSavers are in the Open position

7 Verify the FuseSaver status – Indicator GREEN open



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SIEMENS REMOTE FUSESAVER CONTROL UNIT (CONTINUED)

Closing the FuseSavers

1 Check the FuseSaver to be Open

2 Push the Close button

3 Wait for “Control in Progress” to complete

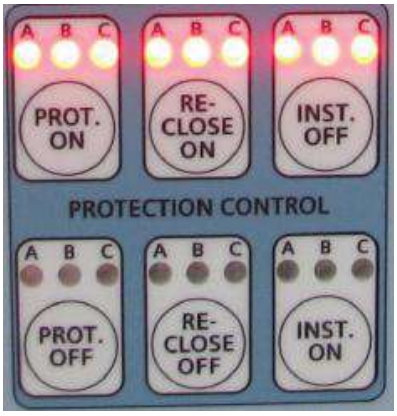
4 Unit closes, CLOSE LED’s go to “Solid” state

5 Check FuseSaver to be closed

6 Turn Remote Control back ON

Protection ON/OFF – To Switch Protection ON/OFF

USED WHEN THE UNIT IS NOT PERFORMING CORRECTLY



1 Turn OFF Remote Control

2 Push Prot ON/OFF button

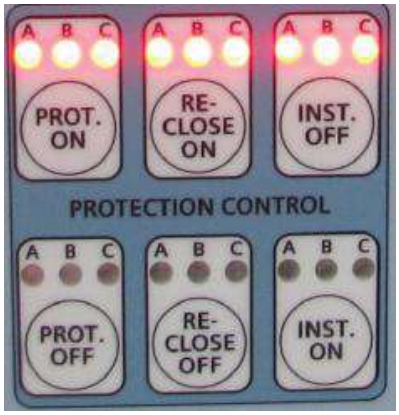
3 Control in Progress, Prot ON and Prot OFF will flash

4 Control in Progress & Prot ON & OFF will stop flashing once operation is complete

5 Prot ON or OFF LED’s will go to Solid state (Depending on operation ON or OFF)

6 Turn ON Remote Control

Re-Close ON/OFF – Switching Re-Close ON/OFF



1 Turn OFF Remote Control

2 Push Re-Close ON/OFF button

3 Control in Progress, Re-Close ON & OFF will flash

4 Control in Progress & Re-Close ON & OFF will stop flashing once operation is complete

5 Re-Close ON or OFF LED’s will go to Solid state (Depending on operation ON or OFF

6 Turn ON Remote Control

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SIEMENS REMOTE FUSESAVER CONTROL UNIT (CONTINUED)

Instantaneous ON/OFF

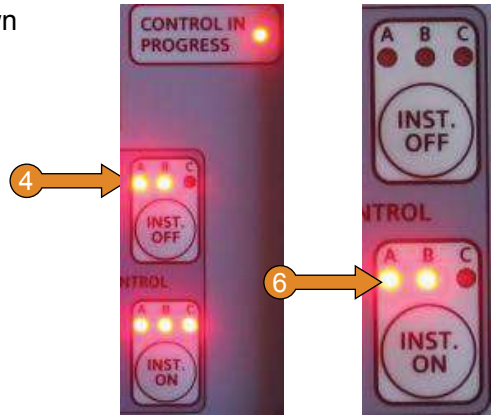
It is very important to note that the Inst. ON LED's can indicate that the Inst. is ON even though the FuseSaver levers are in the "UP Position" This behaviour is due to the fact that Inst. ON can be operated via Remote Control and Local without pulling the FuseSaver lever Down.

However by pulling the FuseSaver levers down, the Inst. ON LED's and the Reclose OFF LED's will go to the Solid state indicating that the levers are Down and also FuseSaver lever indicators on the control panel will be solid showing down.

Note:
ON - *sets Inst to one fast one shot.*
OFF – *sets it back to normal operation*

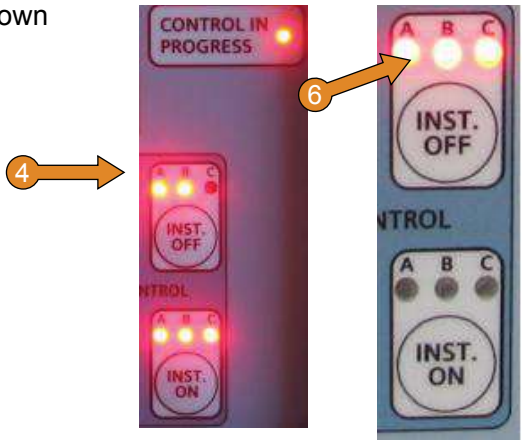
Switching Instantaneous ON

1 Check the status of the FuseSaver lever is it UP or Down
2 Turn OFF Remote Control
3 Push Inst. ON button
4 Control in Progress, Inst ON and Inst OFF will flash
5 Control in Progress & Inst. OFF will stop flashing once operation is complete
6 Inst. ON LED's will go to Solid state
7 Turn ON Remote Control



Switching Instantaneous OFF

1 Check the status of the FuseSaver lever is it UP or Down
2 Turn OFF Remote Control
3 Push Inst. OFF button
4 Control in Progress, Inst ON and Inst OFF will flash
5 Control in Progress & Inst. ON will stop flashing once operation is complete
6 Inst. OFF LED's will go to Solid state
7 Turn ON Remote Control



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HORSTMANN ALPHA M FAULT INDICATOR

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MERLIN GERIN EASERGY FLAIR 21D FAULT

MERLIN GERIN / SCHNEIDER EASERGY FLITE 110

SOULE FLITE 110 FAULT INDICATOR

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CHK LINETRACKER LT30 FAULT INDICATORS

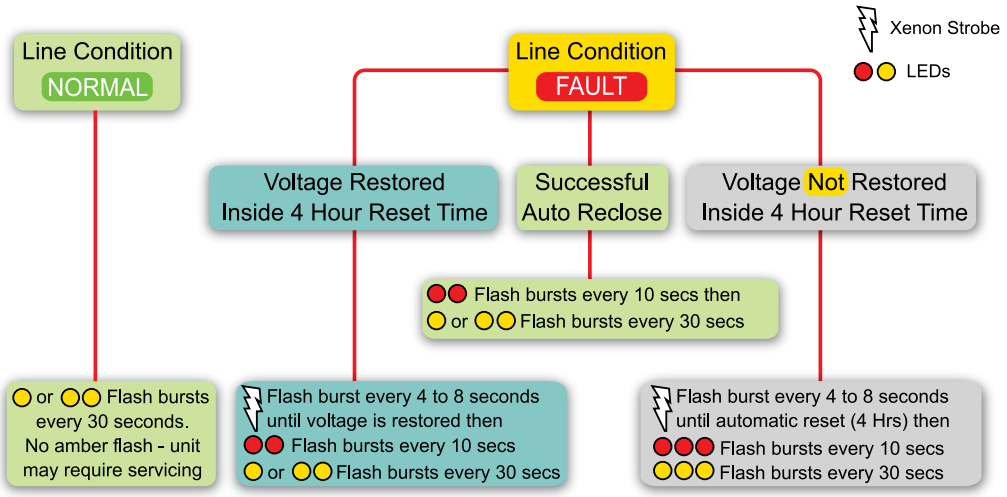
Prior to any operation:

- Note: The reset times for this fault indicator are as follows:
  - Xenon flash is four (4) hours if voltage is not restored.
  - Red/Amber LEDs – up to seven (7) days depending on the configuration.
- This fault indicator has a provision for SCADA input.

Functions: Fault Indication, Re-setting
Rating: N/A
Insulant: N/A
Voltage: N/A

Fault Indication

1 Fault Indication is shown by either flashing red LEDs or xenon (white) strobe light. Normal condition is shown by flashing amber LEDs. Refer to the Fault Indication Chart below.



Note: *If, under normal conditions, the fault indicator does not flash burst either one or two amber lights every 30 seconds, then the unit may be faulty and require servicing.*

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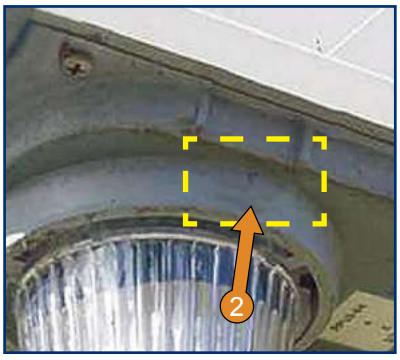
CHK LINETRACKER LT30 FAULT INDICATORS (CONTINUED)

Resetting the Fault Indicator – Manually

1. Attach the reset magnet to the HV operating stick.
2. Move the reset magnet over the resetting position as shown. The red LED should flash once followed by the amber LED flashing once followed by the xenon strobe flashing once. If this self test cycle does not occur the unit may be faulty and require servicing.



Note: *If, when resetting the unit, the self test cycle of one red flash, one amber flash, one xenon strobe flash does not occur then the unit may be faulty and require servicing.*

Fault Indication Legend

Xenon Strobe

Permanent Fault (No volts on line up to the 4 hour reset period)

Red LEDs – Fault Status

- ● ● ● Permanent Fault (No volts on line after the 4 hour reset period)
- ● ● Transient Fault (Volts on line before the 4 hour reset period)
- ● Self Clearing Fault (Current spike with no protection operation)

Amber LEDs – Line Status

- ● ● ● No volts on line
- ● ● Volts on line with zero or minimal current
- ● Condition normal - volts and current on line

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CHK RPU3 FAULT INDICATOR

Prior to any operation:

- This fault indicator WILL NOT detect a phase to phase fault where the current flows in the outside conductors on the pole to which the fault indicator is attached.
- This fault indicator has a provision for SCADA input.
- The fault indicator will automatically reset in either four (4) or (8) hours depending on settings.

Functions:	Fault Indicator, Self Resetting, Manual Resetting, Manual Triggering
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Fault Indication - Automatic Resetting

1 Fault current indication is shown by the red LEDs flashing approximately every three (3) seconds.

Resetting / Triggering the Fault Indicator Manually

1 Attach the reset / trigger magnet to the HV operating stick.

2 Move the reset / trigger magnet over the ‘TEST’ pad as indicated to reset or trigger the fault indicator as required.

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FISHER PIERCE FAULT INDICATOR

Prior to any operation:

- These fault indicators automatically reset in approximately eight (8) hours.

Functions:	Opening, Closing
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

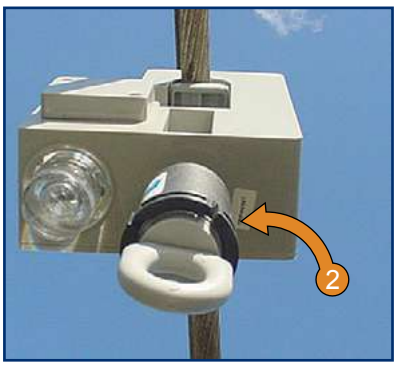
Fault Indication – Automatic Resetting

1 Fault current indication is shown by the LED flashing approximately every three (3) seconds.

Resetting / Triggering the Fault Indicator Manually

1 Attach the reset / trigger magnet to the HV operating stick.

2 Move the reset / trigger magnet over the ‘TEST’ pad as indicated to reset or trigger the fault indicator as required.



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HORSTMANN ALPHA E FAULT INDICATOR

Prior to any operation:

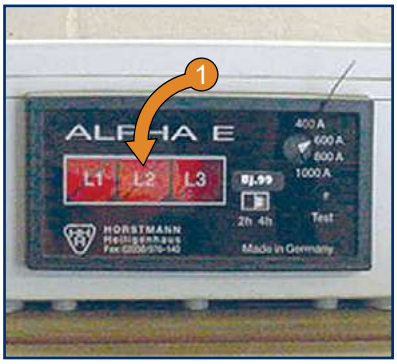
- These fault indicators automatically reset in either two (2) or four (4) hours depending on the setting.

Functions:	Fault Indicator, Self Resetting, Manual Resetting, Manual Triggering
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Fault Indication – Automatic Resetting

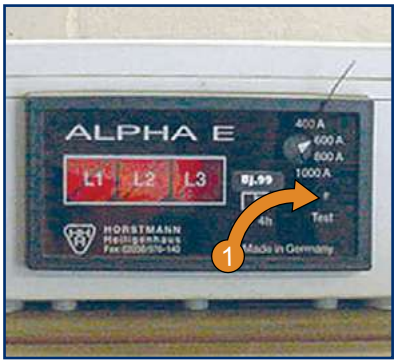
1 Fault current indication is shown by the red

semaphores - one (1) per phase - as shown.



Resetting / Triggering the Fault Indicator Manually

1 Press the ‘Test’ button to reset / trigger the fault indicator manually.



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HORSTMANN ALPHA M FAULT INDICATOR

Prior to any operation:

- These fault indicators DO NOT automatically reset.

Functions:	Fault Indicator
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Fault Indication

1 Fault current indication is shown by the red semaphores- one (1) per phase - as shown.

Resetting/triggering the Fault Indicator Manually

1 Spin the ‘Reset I Test’ knob ACW to reset the fault indicator.

2 Spin the ‘Reset I Test’ knob CW to manually trigger the fault indicator.

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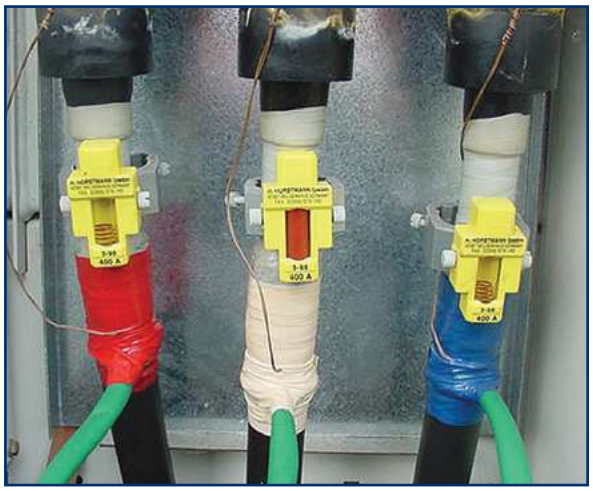
HORSTMANN FLUID TYPE FAULT INDICATOR

Prior to any operation:

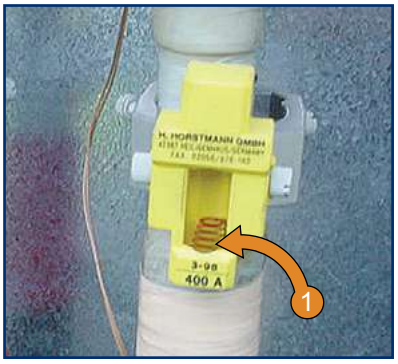
- These fault indicators cannot be reset manually. Automatic resetting takes approximately four (4) hours.

Functions:	Fault Indicator, Self Resetting
Rating:	N/A
Insulant:	N/A
Voltage:	N/A



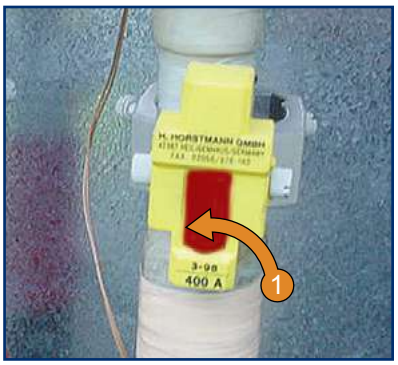
Fault Indication - Normal

1 Circuit normal indication is shown by the clear liquid as shown.



Fault Indication - Fault

1 Fault current indication is shown by the clear liquid turning red in colour as shown.



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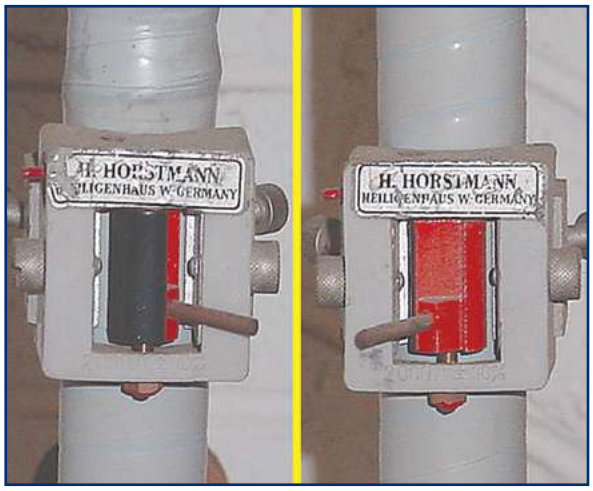
HORSTMANN ROTOR TYPE FAULT INDICATOR

Functions: Fault Indicator, Manual Resetting
Rating: N/A
Insulant: N/A
Voltage: N/A

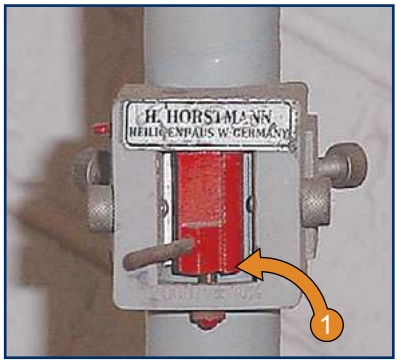
Prior to any operation:

- They do not reset automatically.
- An HV operating stick must be used to reset the fault indicator manually.



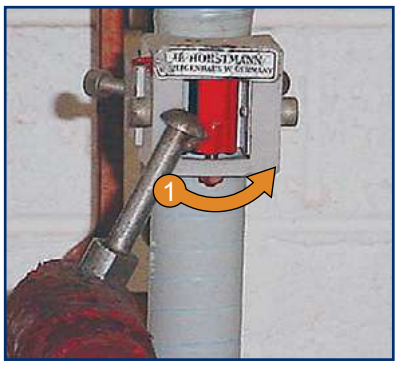
Fault Indication

1 Fault current indication is shown by the movement of the fault indicator rotor from the black (normal) position to the red (fault) position as shown.



Resetting the Fault Indicator Manually

1 Using a HV operating stick rotate the fault indicator rotor back to the black (normal) position as shown.



HORSTMANN ROTOR TYPE FAULT INDICATOR

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LINETROLL 111K/110E FAULT INDICATOR

Prior to any operation:

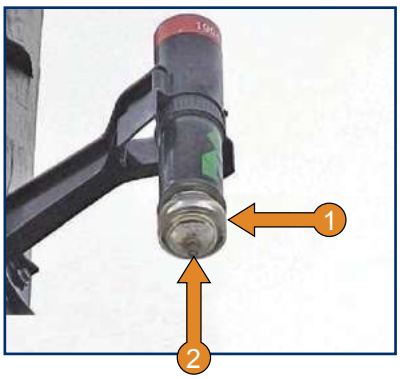
- Check/confirm light indicators.

Functions:	Fault Indicator, Targets
Rating:	Variable
Insulant:	N/A
Voltage:	22 KVa

Fault Indication

1 If a fault is detected on the line the Linetroll will emit a xenon gas flash every five (5) seconds. This flash can be seen from a distance of app. 200 - 300 meters in daylight and app 2 - 3 kms at night.

2 A secondary, high intensity LED indication (easily monitored from the ground directly under the unit) can be programmed into the unit independent of the xenon flash. The operation of this LED can can programmed into different modes- transient or normal indication.



Resetting the Fault Indication

1 The fault indicator can be reset in three (3) different ways.

A. AUTOMATIC - By preset internal timer.

B. AUTOMATIC - When the line is re-energised.

C. MANUALLY - Using the Test/Reset magnet tool (TBX-10).

2 The automatic presets can be programmed into the Linteroll by resetting of internal DIP switches.

Note: *If the xenon flash is reset by the internal preset timer before the line is re-energised the LED will continue to flash until the line is re-energised. This prolonged indication lasts a maximum of twenty four (24) hours to enable fault tracing after a fault occurence if the line is still de-energised during this time.*

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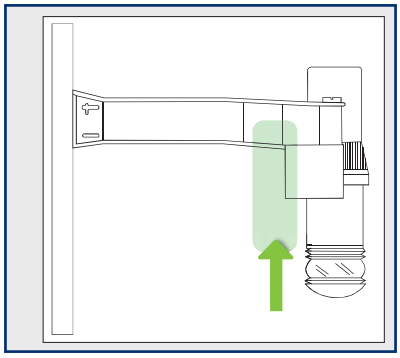
LINETROLL 111K/110E FAULT INDICATOR (CONTINUED)

Resetting the Fault Indicator - Manually



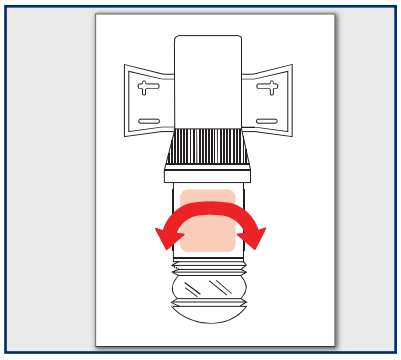
1 Fix the test/reset tool (TBX-10) on a stick.

2 Guide the tool between the arms of the Linetroll mounting bracket, as shown by the green arrow and the green shaded position indicator, until it stops in the upper position. The magnet on the tool will then be level with the yellow spot on the indicator label marked 'RESET'.

3 Keep the tool in this position until the red LED stops flashing (within 3 sec) then remove very slowly.

Note: *After resetting the Lintroll remove the reset tool very slowly to avoid reactivating the fault indicator.*

Testing the Fault Indicator – Manually



1 Ensure the internal DIP switch 8 is in the 'OFF' position and the line is energised.

2 Fix the test/reset tool (TBX-10) on a stick.

3 Wave the test tool in front of the fault indicator lens as shown by the red arrow and the red shaded position indicator. The Linetroll will start flashing.

4 If programmed for voltage reset the Linetroll will reset after 15 -> 30 Seconds.

Note: *Before manually testing the Linetroll ensure the internal DIP switch 8 is in the 'OFF' position and the line is energised.*

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MERLIN GERIN EASERGY FLAIR 21D FAULT

Prior to any operation:

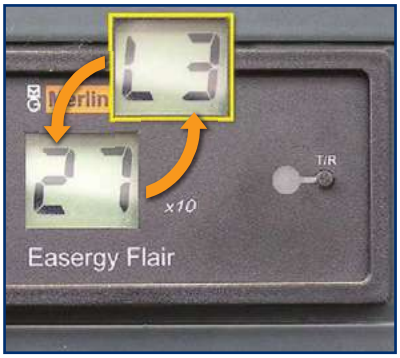
- The Easergy Flair fault indicator has a lithium backup battery that will keep the display active for up to 4 hours during a total power interruption.

Functions:	Fault Indicator, Targets, Digital Readout
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Fault Indication Normal Display

1 Normal display: The fault indicator LCD display will automatically cycle between the relevant phase L1 or L2 or L3 and the respective phase load current - the display figure multiplied by ten.

- The adjacent image shows phase L3 with a load current of 27 x 10 = 270 Amps.



Fault Indication – Fault Detected

1 If a phase fault is detected the LCD will display the relevant phase L1 or L2 or L3 and the red LED will flash once every three (3) seconds

2 If a 3 phase fault is detected the LCD will display OC and the red LED will flash twice every six (6) seconds.

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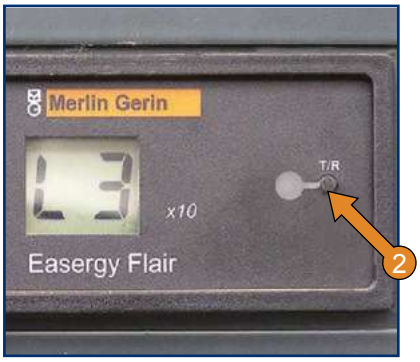
MERLIN GERIN EASERGY FLAIR 21D FAULT (CONTINUED)

Resetting the Fault Indicator

The fault indicator can be reset by:

1 Automatically – This can be configured for a period of seventy (70) seconds or greater or a time out (non-configurable) of four (4) hours.

2 Manually – Press the T/R button once.



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MERLIN GERIN / SCHNEIDER EASERGY FLITE 110

Prior to any operation:

- If the Easergy Flite 110 SA fault indicator is flashing to indicate a transient fault and a permanent fault occurs the flashing duration will change to indicate a permanent fault.
- The flashing duration is different for each fault indication - transient or permanent. The LED intensity remains the same for both fault indications.
- The Easergy Flite 110 SA fault indicator resets automatically when power is restored.

Functions: Fault Indicator, Targets
Rating: N/A
Insulant: N/A
Voltage: 22 kV

Fault Indication - Permanent

1 If a permanent fault is detected on the line the conical LED indicator on the Easergy Flite 110 SA will flash once every three {3) seconds.

Fault Indication - Transient

1 If a transient fault is detected on the line the conical LED indicator on the Easergy Flite 110 SA will flash twice every twelve (12) seconds.

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MERLIN GERIN / SCHNEIDER EASERGY FLITE 110 (CONTINUED)

Resetting the Fault Indicator - Manually

1 Attach the reset magnet to a HV switch stick.

2 Move the magnet across the base of the fault indicator on the opposite side to the conical LED indicator green shaded area as shown.

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SOULE FLITE 110 FAULT INDICATOR

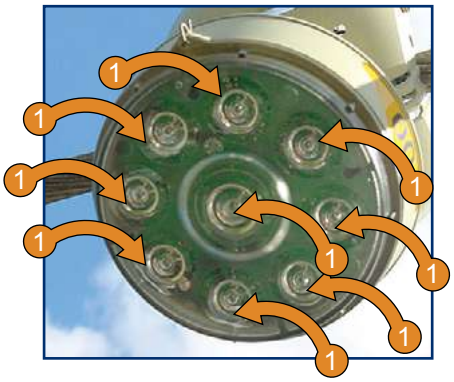
Prior to any operation:

- These fault indicators automatically reset in approximately eight (8) hours.

Functions:	Fault Indicator, Targets
Rating:	N/A
Insulant:	N/A
Voltage:	N/A

Fault Indication - Automatic Resetting

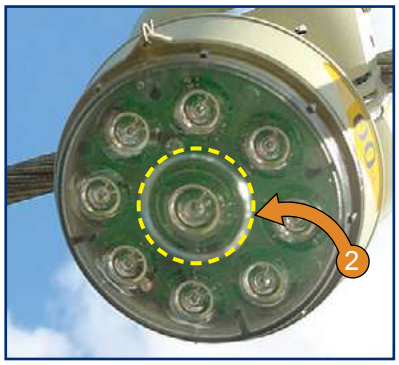
1 Fault current indication is shown by the nine (9) LEDs flashing approximately every three (3) seconds.



Resetting / Triggering the Fault Indicator Manually

1 Attach the reset magnet to the HV operating stick.

2 Move the reset magnet over the centre LED as shown to reset or trigger the fault indicator.



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