



High Voltage Ground Switch and Interlock Operation Inspection

Standard
Operating
Procedure

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1.0 Purpose

This SOP provides:

- A standard to follow when inspecting the installation of a high voltage ground switch and interlock.

2.0 Roles and Prerequisites

Role(s)	Quantity Required	Prerequisites
Powerline Technician/ Contractor Inspector	1 or more	1. SaskPower Standard Protection Code Training 2. Qualified Electrical Worker

3.0 Tools and Equipment

Minimum Tools and Equipment Required:

- Binoculars or spotting scope
- PPE
- Switch Commissioning Form
- Camera

4.0 Procedure

The Procedure

NOTE: The following requirements shall be met prior to the start of the procedure:

- Complete Hazard/Aspect and Risk Assessment
- Applicable Personal Protective Equipment (PPE) is available and in good condition
- Obtain SaskPower Standard Protection Code and other related permits
- Reviewed work practices: limits of approach, testing for absence of potential and proper grounding procedures

NOTE: This procedure applies to all makes of high voltage ground switches.

This SOP is based on Southern State switches. Some brands of switches may operate and look different than what is illustrated in this SOP. However the required end result is the same. For other makes of switches refer to the supplied setup manual for exact tolerances and requirements.

1.0 Inspecting Operation of a Ground Switch

1.1 Inspection Operation of a Ground Switch

1.1.1 The Powerline Technician/Contractor Inspector shall, for ground switch and interlock operations ensure the following:

- *For all switches equipped with ground switches, confirm that the blades open to the correct direction as per engineering design*
- *Confirm the ground switch is grounding the correct side of the bus as per SaskPower design*
- *The ground mat(s) are in the correct location and are level as per engineering design*
- *Control handles are in the correct location as per engineering design*
- *Confirm that the ground switch contacts have been cleaned and lubricated with bar graphite.*
- **Note:** *The switch may not open or close properly if not lubricated.*

Graphite Lubricant 1½" x 4" x ¾" Block



UOM:each

Package:12 ea/carton

Item ID

Wt(lbs)

11400006

0.25

Stock Coded Graphite Bar

1.1.2 The Powerline Technician/Contractor Inspector shall ensure the following conditions are met:

- *Confirm that the blade tip enters the jaw in the center and in a straight line.*
- *Confirm that the blade tip penetrates deep enough into the jaw that it comes firmly against the blade stop.*



Examples of Proper Ground Blade Penetration

- *Confirm that there is a positive toggle in the control handle in the fully closed position*



View of the Outboard (Fifth) Bearing where Toggle will be present

NOTE: See Component "SOP Centre Break Switch - Bearing Toggle Video"

- *Confirm proper operation of the ground switch interlock. **NOTE:** These interlocks differ depending on the switch manufacturer.*
 - Confirm the proper mounting height of the interlock as per manufacturer installation manual.
 - The switch interlock must stop the line switch from closing when the ground switch is closed, and stop the ground switch from closing when the line switch is closed.



Example of an Interlock

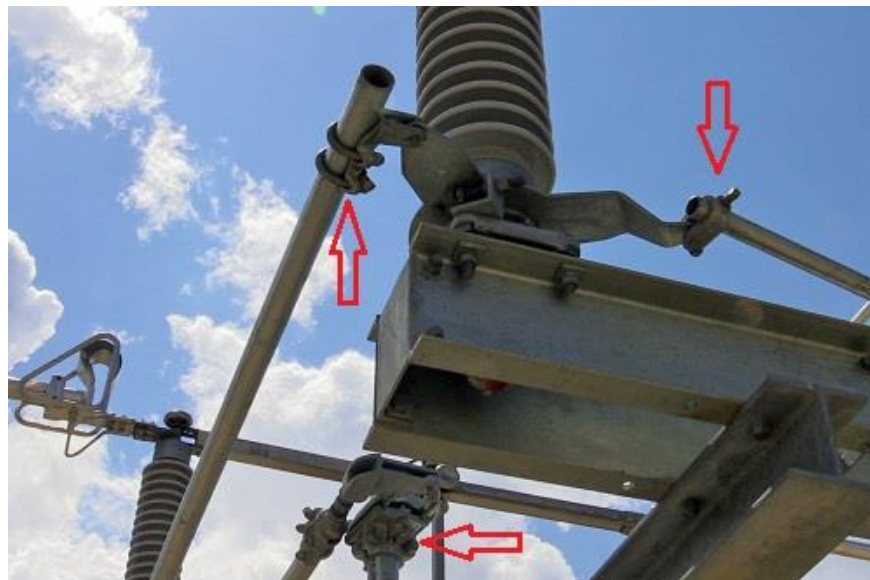
NOTE: See Component "SOP Ground Switch and Interlock Inspection - Interlock Operation Video"

- *Confirm all adjustment bolts and interphase pipe turnbuckles are tight*



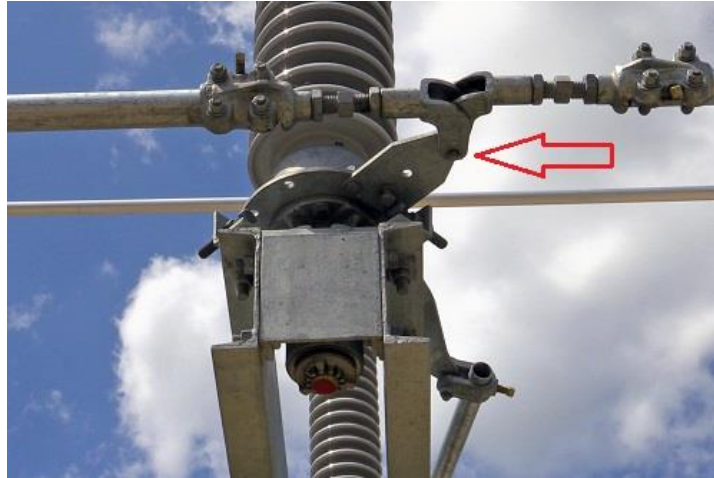
View of Turnbuckle Jam Nuts

- *Confirm all setscrews are pierced through the pipe walls. These piercing screws are located at several locations.*



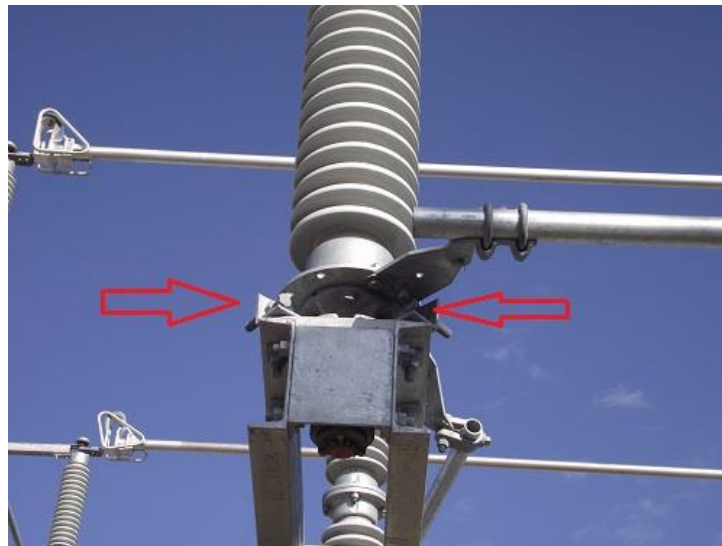
View of some of the Piercing Screws

- *Confirm all cotter keys are installed and bent between 15 and 20 degrees. These cotter keys are located at several locations*



View of a Cotter Key Location

- *Confirm all bearing stops are lightly touching or have a small gap in both open and closed positions*



View of Switch Open/Close Stops

- *Confirm that the open & closed indicator signs are installed correctly*



View of Closed Indicator Sign, Open is on Opposite Side of Pipe

- *Confirm the grounding mat(s) and switch are grounded properly according to the **SaskPower specs**, and that the grounding mat(s) are level and at the correct height.*



View of Grounding Mat



View of Main Drive Pipe Ground



View of Ground Blade Grounding

- Confirm the switch designation signs are correct and mounted in the correct location



View of Switch Designation Sign

1.1.3 The Power Line Technician/Contractor Inspector shall complete the switch commissioning form and document the switch name plate data:

- Refer to the "Line Switch Commissioning Form"



View of the Switch Name Plates



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Line Switch Commissioning Form

Switch Designation:	Commissioned By:	Date:
Switch Manufacturer:	Serial Number(s)	Manufacturer Ref or Style #
Year of Manufacture	Voltage Rating (kV)	Basic Insulation Level (BIL) (kV)
Continuous Current Rating (A)	Momentary Current Rating (A)	Vacuum Interrupter Rating (if equipped)

Items	Checked	Comments
Grounding – Measured Resistance less than 100. Provide measured resistance.		
Switch is installed as per job specification with no visible damage. Insulators have been cleaned.		
Correct operation of main contacts, arcing horns, whips and vac-rupters (if equipped)		
Contacts have been cleaned and properly lubricated with graphite bar.		
Alignment and timing as per manufacturer's instructions.		
All phases lean back at 91° in open position. All phases are synchronized and touch the open stop at the same time.		
All phases are synchronized and touch the closed stop at the same time in the closed position.		
All hardware double checked for proper torque. All pins installed head up with cotter pin installed. All piercing bolts installed.		
Switch Designation Placard and all other required signage installed.		
Switch Name plate data tag(s) installed near operating handle.		
Damage to coating has been repaired. Uncoated steel (ie screw pile caps) have been coated.		
Photographs of installation have been sent of AM&FS.		
One copy of the manufacturer supplied drawings & manual have been sent to AM&FS.		

Switch is installed as per the job specification and manufacturer's installation manual.
 The switch operates correctly and is ready for service: Yes No

Comments:

View of the Line Switch Commissioning Form

NOTE: Refer to the "Line Switch Commissioning Form" found in this SOP Bundle

- Take pictures of the Apparatus in the fully open and fully closed positions, and all three phase current carrying contacts in the closed position.
- Send the pictures, along with the Line Switch Commissioning Form electronically to the Construction Department for input into SAP.



- Apparatus in the fully open and fully closed positions, and all three phase current carrying contacts in the fully closed position.

5.0 Components

The following is a list of components for this SOP which can be accessed through the SOP System:

Component Name	Component Type	Component Description	Location of Component
High Voltage Ground Switch and Interlock Operation Video	Video	A video providing information for this procedure	SOP Online - SOP Bundle: High Voltage Ground Switch and Interlock Operation Inspection

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Line Switch Commissioning Form	Form	A form to be completed for this procedure	SOP Online - SOP Bundle: High Voltage Ground Switch and Interlock Operation Inspection
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6.0 Acronyms, Definitions and Symbols

Acronyms and Abbreviations

N/A

Definitions

N/A

Symbols

N/A

7.0 Policies and Regulatory Requirements

This SOP is a result of the following regulations, policies, industry standards, and corporate directives and standards:

Regulatory Requirement(s)

- N/A

Policies

- Job Hazard Assessment Policy
- Personal Protective Equipment

Standards

- N/A

Other

- SaskPower Standard Protection Code
- SaskPower Safety Rulebook



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8.0 References

References

N/A