

# Installation of Field Switches

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# Field Switch Installations

## A Brief Review

- Function
  - T-line taps
  - Parallel Circuits
- Capabilities
  - Open an Energized and Unloaded Line
  - Interrupt a Parallel Path



# Typical Field Switch Parameters

- 69 kV, 115 kV, and 138 kV levels
- Typical Rating
  - 600, 1200, 2000 amps
- Pole mounted and tower mounted
- Attachments
  - Line Dropping
  - Loop (Parallel Path) Breaking



# Line dropping stresses

- High recovery voltage
- Higher arcing stresses than loop switching
- Low currents
- High Velocity Interrupter Application

# Loop Switching Stresses

- Potentially high currents
- Recovery Voltage Limitation
  - Not readily determined
  - Function of loop impedance
  - Varies with MVA loading
- Vacuum Bottle Application

# Switch Attachments

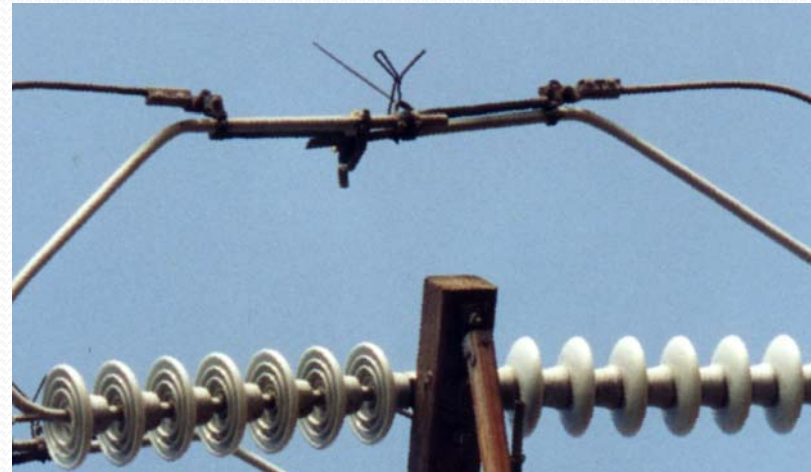
- Arcing horns
- Vacuum Bottle
  - 1 contact
  - 3 contacts
  - 5 contacts
- Vacuum Bottle plus Varistor
- High Speed Interrupter



# Installation Issues

## Arcing Horns

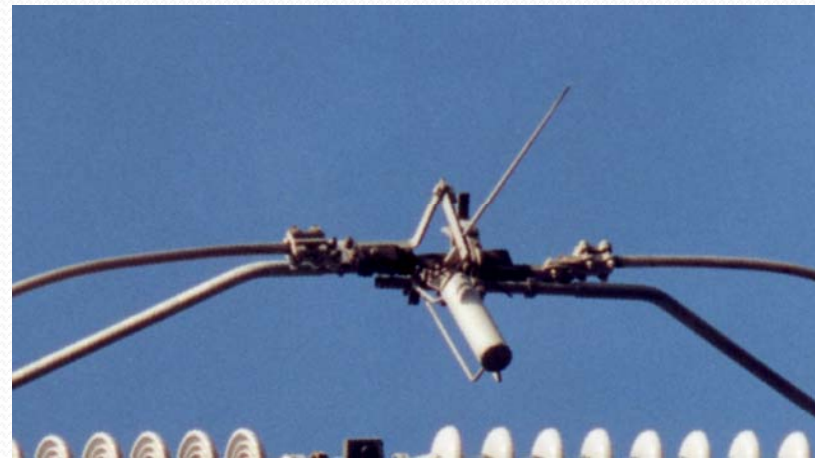
- Manufacturer Standard
- Most Common
- Limited Capability
- No Specific Construction Concerns



# Installation Issues

## High Speed Break

- Designs Vary by Manufacturer
- Device “cocked” when switch is closed
- Used for line dropping
- Can be Installed out of Alignment Greatly Reducing Capability



# Installation Issues

## Vacuum Bottle

- Designs Vary by Manufacturer
- Third Party Fabricator
- Can be Installed Out of Alignment
- Must be Field Tested at Site During Installation



# Installation Issues

## Structures

- Wood Poles
  - Switch Frame Type
  - Pole Twist Misalignment
- Steel Poles/Concrete Poles
  - Field Drill
  - Maintenance Access
- Lattice Towers
  - Operating Mechanism



# Safety Concerns

- Operating Platforms
- Reduced Speed of High Speed Interrupter
- Overvoltage on Vacuum Bottle Contact
- Actuator Malfunction
- Phase to phase flashover
  - Arc Bridging
  - Power Backflash

# Goals and Objectives

- Consolidation of Application of Attachments
  - Very few Utilities Agree on Attachment Capabilities
  - Provide Some Practical Guidelines
- Address Switch Platform Grounding Issues
- Coordination with ESMO

