FIRSTPOWER
Instructions

MDL

Circuit Breaker Minimal Disassembly Lubrication Kit

The following Minimal Disassembly Lubrication (MDL) Procedure is to be used with only slight variations caused by local situations:

1. **Obtain and Record** using First Trip Device **(a)** on-line first trip of close time, **(b)** after breaker is isolationed, offline three sets each of trip and close times if the situation permits, **(c)** trip coil current and **(d)** close coil current.

2. **Inspect Visually** for broken or worn components that need immediate attention.

3. **Clean:** Apply two rounds of #2 MDL cleaner on all identified bearings and moving surfaces on the mechanism. Use the cleaner and a small brush to remove as much old grease, oil and dirt as possible.
   - Operate breaker close-open three times after each round of cleaner is used
   - This is to work the cleaner into the bearing

4. **Lubricate:** Apply two rounds of FirstPower #3 FSL fluorosilicone oil on all identified moving bearings and surfaces. Use a conservative amount of oil and cleaner and rags to collect excess oil.
   - Operate breaker close-open three times after each round of oil is used
   - For easily reached parts such as trip latch rollers, sprockets, gears or cams, use Dow Corning 3451 grease after cleaning. Rub the grease into surfaces with brush or gloved finger; leave only a thin film

5. **Wipe Excess Oil** and grease off the mechanism and bottom of cabinet before closing the breaker cabinet.

6. **Obtain and Record Final Readings** using First Trip Device **(a)** offline three sets each of trip and close times if the situation permits.

7. **Remove Grounds**; return breaker to service; capture on-line close -trip- close times, trip coil current and close coil current for records.

8. **Notes:** If variations from expected performance are found during cleaning or lubrication, additional time and effort should be taken to understand and document the cause.

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Dos and Don'ts

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Do

- Use the solvent supplied in the MDL kit. The solvent must be compatible with the fluorosilicone oil or the oil will not penetrate tight spaces
- Rub grease into external surfaces; leave only a light film
- Wear gloves—the solvents, oils, and grease are chemicals and will penetrate skin
- When additional lubricant is needed in the future, use the oils and greases in the MDL kit to renew the original application

Don't

- Pack bearings with grease or leave large quantities of grease on surfaces
- Use spray solvents—they wash out lubricating oils and greases
- Use greases with different thickeners. They may make the greases incompatible, resulting in poor lubricating properties. Clean surfaces thoroughly if changing grease

Lubricant Knowledge

- Grease is characterized by the oil from which it is made. A grease consists of 80-95% oil, 2-15% thickener and 0-10% additives
- There are 4 broad categories of oil:
  - Petroleum or mineral oil: do not use this on circuit breaker mechanisms. It oxidizes rapidly and has narrow temperature range. It is too viscous to penetrate tight spaces.
  - Synthetic hydrocarbon oil: PAO most common, e,g, Mobil 28. Estimated life 8–10 years. Do not use esters–limited life
  - Synthetic silicone oil- ok for very light loads only
  - Synthetic fluorinated oil: e.g. FPG 3FSL oil and Dow Molykote 3451 grease. Long life, good lubricant, resistant to aerosol sprays and salt environment. Estimated life 15–25 years