Type BZO Breaker Maintenance Program

Service Solutions for your T&D Infrastructure

Power Transmission & Distribution
Type BZO Circuit Breaker
Major Maintenance Program

Major Maintenance
Allis-Chalmers manufactured BZO oil circuit breakers as early as the 1950s rated from 121 up to 245 kV. In the late 1970s, Siemens purchased the rights to the Allis-Chalmers design and continued to manufacture them until 1996. Although most BZO oil circuit breakers are more than 30 years old, complete circuit breaker replacement may be costly and not necessary in most situations. Siemens is committed to supporting you with OEM parts and factory-trained field service support throughout your breaker’s life-cycle.

Maintenance Intervals
Siemens recommends that the breaker be inspected mechanically and electrically at least once every six months.
Siemens recommends that major maintenance, a comprehensive internal investigation of the condition of the interrupter, contacts, and other internal components be performed, depending on the following factors:
- One full-fault
- Five times the accumulated interrupting rating (faults less than breaker rating)
- 250 mechanical operations
- 5 years of service
- Accumulated experience of breaker characteristics

Field Service
With Siemens PT&D Services, an experienced, factory-trained engineer who specializes in HV breaker maintenance will be on-site to assist each step of the way.
Siemens can assist with:
- Technical Field Assistance
- Turnkey Maintenance
- Turnkey Breaker Replacement

Siemens Power Circuit Breaker Training
The BZO 2-day training program is tailored to increase the knowledge of personnel responsible for the maintenance of HV oil breakers and focuses on hands-on practical, rather than theoretical, training. Your personnel can attend a program conducted at our Power Circuit Breaker factory in Jackson, MS, or training can be combined with technical field assistance during a scheduled outage.

Customer Benefits:
- Hands-on experience for the crew
- Maintenance and repair sequencing
- Factory adjustment procedures and tolerances
- Problem analysis
- Final check-out
Type BZO Circuit Breaker
Renewal Parts Solutions

Renewal Parts
Should renewal parts be required during major maintenance, Siemens maintains a multi-million dollar inventory for rapid supply of many key components.

Customer Benefits:
- Experienced in-house renewal parts specialists
- Access to OEM Engineering Departments that understand your equipment design
- Parts manufactured and tested to OEM specifications which include the latest design and material improvements
- 24/7/365 part availability

Maintenance Kits
To reduce outage downtime, particularly when several breakers will be inspected, many customers order maintenance kits to have on hand in the event the parts are required during maintenance.

Interrupter Maintenance Kits
Siemens has designed interrupter maintenance kits containing all moving contacts, contact fingers, push rods, baffles, tubes, washers, and springs which may require replacement during maintenance.

Operator Seal Kits
Siemens has designed operator seal kits for the PH family of pneumatic operators containing all wearable seals which may require replacement during maintenance.

Upgrades
- **Interrupting Rating**
  Depending on age and breaker design, Siemens can increase from 40 to 50kA.
- **Dual Trip Coils**
  Additional trip coils provide redundancy.

Life-Extension
Over time and various design evolutions, some of our original sub-suppliers are no longer in business or have stopped supporting the lower volume requirements that go with out-of-production equipment. Siemens has designed life-extension solutions to ensure optimum services from your BZO breaker for years to come.

- **Power Unit Modification**
  Replace out-of-production Barnes, Kenett, Rexroth, or Lewis Sheppard pumps with modern design.
- **Power Unit Manifold Modification**
  Upgrade power unit from manifold with threaded pipe plugs to plugs with o-ring seals. Includes blow-out plug on back of the power unit for increased safety.
- **Accumulator**
  Replace older style bladder-type accumulator with superior piston-type design.
- **Control Valve (BZO7 - PN7 operators)**
  Replace out-of-production air valve with modern design.
- **Electrical Components**
  Siemens can provide replacement components for most out-of-production motors, relays, switches, coils, and heaters.
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Maintenance Tips

The following tips are useful during major maintenance, troubleshooting, and long-term maintenance planning:

Recommended Contact Inspection & Cleaning Procedures
Contacts and arcing contact surfaces should be cleaned or changed when the contact resistance, bushing to bushing, exceeds manufacturer’s specifications. If the maximum values are exceeded, we recommend the contacts be cleaned or replaced. If the contacts are burned somewhat from arcing, but are still in useable condition, use a file to dress the arcing tips. Do not remove the silver plating from the copper surfaces. If the contacts are burned and eroded from arcing so that the contact rods do not make solid contact in the stationary contact assemblies, the contacts should be replaced. Remove excess carbon from the contacts shells and shell baffles using a non-toxic cleaning agent.

Hydraulic Power Unit – Relief Valve Modification
The power unit on PH 33E-5, PH 37E-5, PH 33T-5, and PH 33T-6 pneu-draulic operators has a relief valve built into the manifold. Over-tightening the relief valve adjusting screw can result in bending the inner spring. When this happens, the relief valve begins acting erratic and the system may not build up to operating pressure.
To prevent bending, a design improvement has been made to reduce the load on the inner spring. Other improvements include the outer spring, which is made of square spring steel instead of round wire, and a washer, which has been added in order to distribute the load from the springs on the ball.

Pneu-draulic Operator Accumulators
Over many years we have noticed an increasing failure of accumulator gas bags, generally at the bottom of the gas bag. Our investigations have shown that most of the failures were caused when hydraulic fluid is drained out too quickly.
The drain valve should be cracked between 1/8 and 1/4 turn so that the fluid drains out slowly and so that the bottom of the bag is not pinched or cut. Also, since osmosis occurs, the hydraulic fluid becomes saturated with nitrogen gas. If drained slowly, the fluid does not foam out of the breather.

Hydraulic Ball Valve Leaks
Over many years we have noticed increasing hydraulic leaks due to the aging or wearing of the rubber and leather seals. These can be easily fixed with seal kits, available from Siemens, for all hydraulic operators. We have also designed a replacement flexible hose to replace the rigid by-pass tube on the back side of the ball valve. Where it takes several hours to replace the rigid tube with a rigid tube, it only takes a few minutes to replace it with the flexible hose.

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