Aftermarket Centers of Excellence

Reconditioning of Power Circuit Breakers
Aftermarket Centers of Excellence

5 Dedicated Centers

Baton Rouge
Houston
Kitchener
Pittsburgh
San Diego
Aftermarket Centers of Excellence

Types of service

Class-1 Reconditioning
Class-2 Preventive Maintenance
Repairs
Trip unit retrofits
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Types of Equipment

- Low Voltage (480V)
- Medium Voltage (5KV, 7.2KV, 15KV)
- Contactors (MV Motor Starters)
- MCC Bucket retrofits (480V Motor control)
ACE Class-1 Reconditioning

Class 1 Reconditioning

Exclusive 6-point process

• Incoming inspection and testing
• COMPLETE disassembly
• Component specific parts cleaning/processing
• Re-assembly per Manufacturer’s specifications
• Final inspection and testing
• Documentation into Pow-R Test database
ACE Class-1 Reconditioning

Incoming inspection and testing

Trip bar force: 4.5 lbs
Contact resistance: 92 Micro-ohms
ACE Class-1 Reconditioning

Complete disassembly

Disassemble to its component level

- Racking mechanism
- Operating mechanism
- Frame
- All electrical components
- Current carrying parts

Inspect and test all component parts
ACE Class-1 Reconditioning

Component-specific parts cleaning
ACE Class-1 Reconditioning

Component-specific parts cleaning
ACE Class-1 Reconditioning

Re-assembly

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POW-R Master

LV Breaker
- Bookshelf
- Parts Pro
- Trip Info
- Breaker Master
- Breaker Analyzer
- Test Master

MV Breaker
- Bookshelf
- Parts Pro
- Switchgear
- Breaker Master

MV Contactor
- Bookshelf
- Parts Pro
- Contact Master
- Switchgear
- Wiring Info
ACE Class-1 Reconditioning

Final inspection and testing

Trip bar force 1.5 lbs

Contact resistance 23 Micro-ohms
ACE Class-1 Reconditioning

Test data recorded in Pow-R Test

Pow-R-Test Database

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<th>ACE Job Number</th>
<th>Form Title</th>
<th>Customer</th>
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Class 1 Reconditioned Breaker

- New Trip System
- I.D. Nameplate
- Quality Certificate & Test Form
- Secured for shipment

EATON | Cutler-Hammer
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National Quality Plan

• ISO 9002 compliant

• Quality Assurance Procedures for all aspects of ACE System

• Assures consistent product from all ACE Franchises
Reconditioning

Signs that it is needed

- Worn parts
- Trip shaft bearings
- Lubrication

[Image of mechanical component with annotations]

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Reconditioning

Signs that it is needed

- Dried Lubricants
- Trip Bars
- Cracked Casting
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Why it should be done:
- Old malfunctioning breaker
- Poor coordination
- Nuisance tripping or does not trip at all

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Why it should be done

Switchgear is still in good condition
Reconditioning restores breaker to “like new” condition

Upgrade to modern trip unit
Improve circuit protection
Improve system coordination
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Why it should be done

Cost savings
utilize existing switchgear
no installation costs
no outage/downtime required

Easier to obtain maintenance funding
than capital funding
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What may be found

Cracked Insulating Link
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What may be found

Cracks
Aftermarket Centers of Excellence

What may be found
Aftermarket Centers of Excellence

What may be found

EATON Cutler-Hammer
Aftermarket Centers of Excellence

What may be found
# Aftermarket Centers of Excellence

## The Details make the Difference!

**ACE:**
- Complete disassembly
- 6-point Process
- Dedicated Technicians
- ISO 9000 Compliant Quality Process
- Complete Documentation

**Others:**
- Partial disassembly
- Limited or No Process?
- Part time Engineers/Technicians
- No Quality Program
- Inconsistent Documentation
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Why use Eaton/Cutler-Hammer?

• Class 1 Reconditioning
• Comprehensive OEM database
• Commercial and Nuclear Quality Systems
• Sharing of ACE best practices
• Leading US Manufacturer-
  Power Circuit Breakers
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What a difference!
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What we need to quote

• Circuit breaker nameplate information
• Manufacturer
• Electrically or manually operated
• Wiring diagram
• Digital photos
• ACE Questionnaire
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• Questions?
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THANK YOU!