



Switchboard Retrofits

August 25, 2016



DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Agenda

- Why Retrofit a switchboard
- Navy MILSPEC Breakers
- Old breakers being replaced
- What does a Mod-kit look like
- Switchboard Issues
- Retrofit Concerns

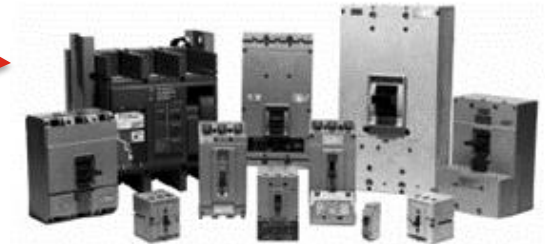
Why Retrofit a Switchboard?

- ACB Replacement:
 - Most often due to obsolescence issues
 - Adding or upgrading a generator or major feeder (2000Amp -> 4000Amp)
- Very rarely do we see a significant retrofit to change an AQB.
- Adding protective relay functionality
- Adding better generator or power management controls
- Improving automation
- Removing manual disconnects
- Who:
 - Mostly NSWC (ISEAs)
 - Sometimes LDY's
 - Sometimes MSC



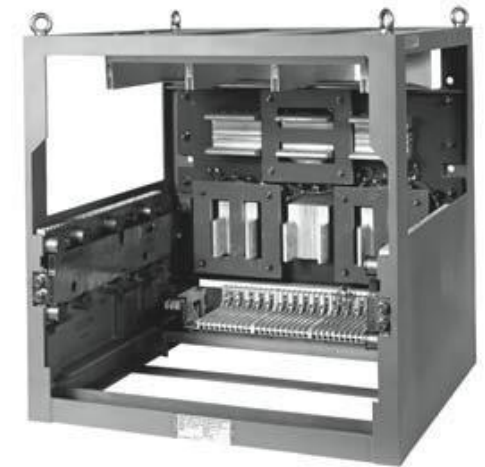
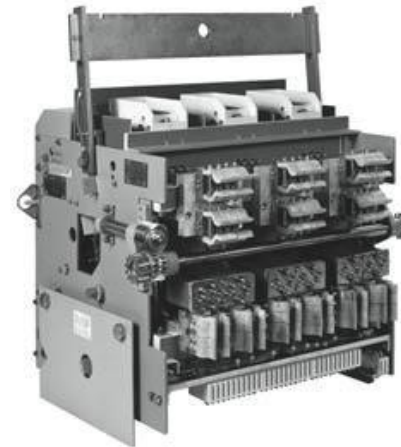
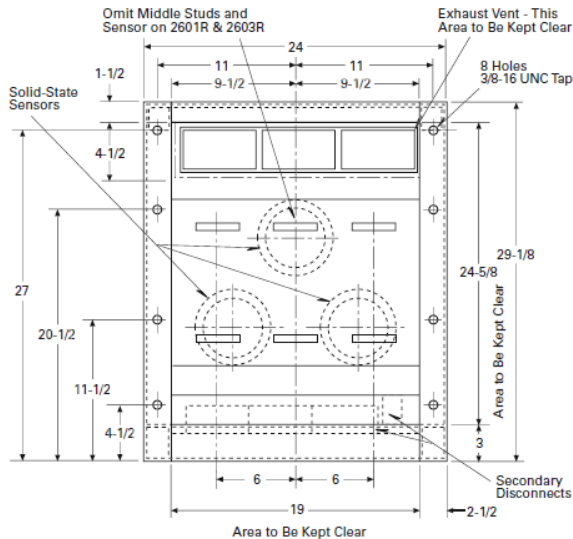
Navy MILSPEC Breakers

- Currently, there are three breaker manufacturers (Eaton, L-3 SPD, and DRS PCT), but there used to be more (including Whipp & Bourne, GE):
 - Eaton offers AQB's
 - DRS offers VCBs and ACBs



Obsolete 4000A ACBs

- Eaton's ACB-4000HR
- 29" h x 24" w x 25" d (cubic)
- Cradle Size is reflective of most older breakers (Eaton, W&B and GE)



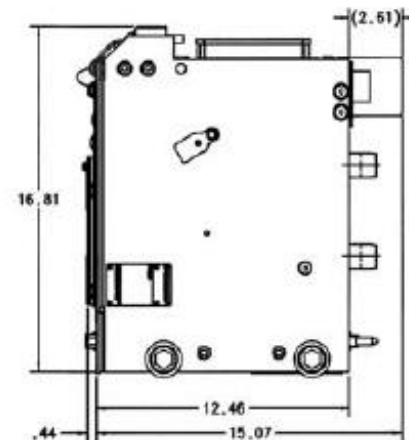
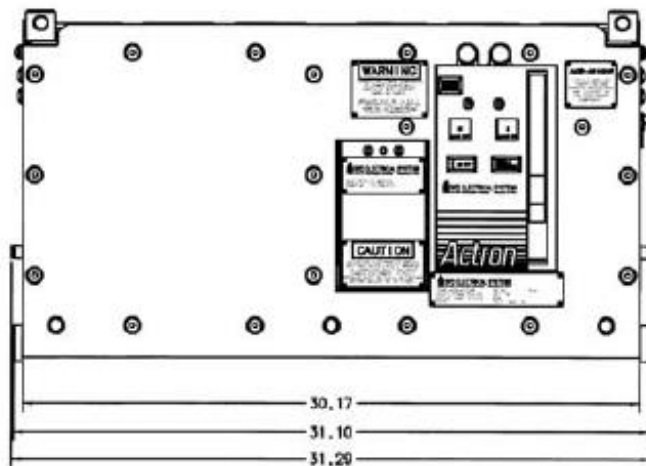
REAR VIEW

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Obsolete ACBs

SPD's ACB-4010

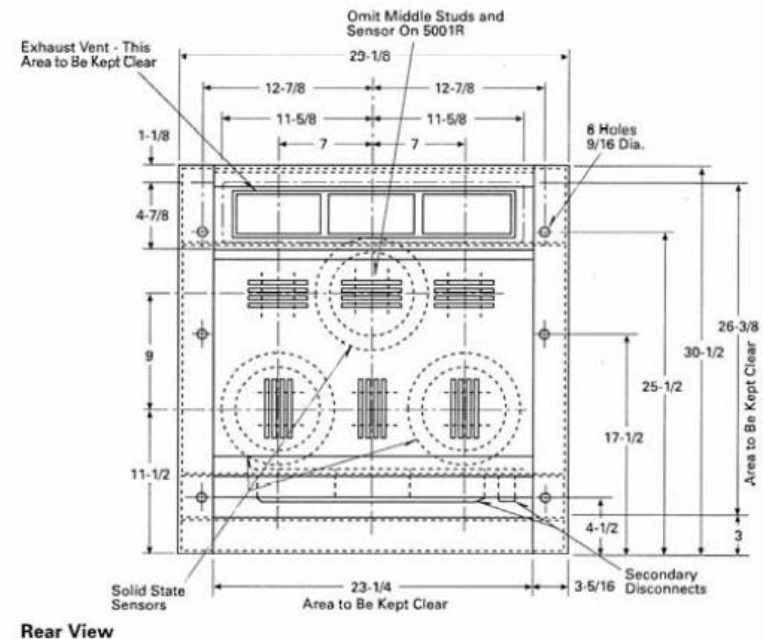
- Obsolete Kernel from MG
- 31" w x 17" h x 15" d
- Size is indicative of newer COTS breakers (wide, not cubic)



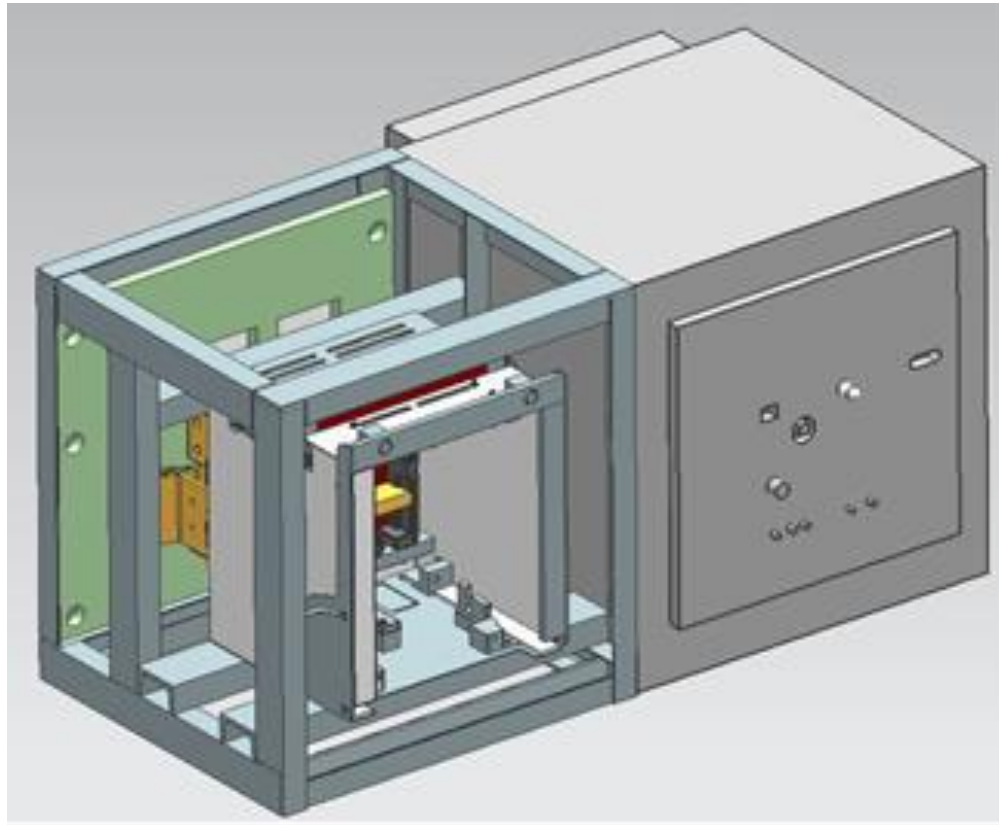
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Retrofitting Breakers

- Size
- Bus placement – matching existing bus
- Controls:
 - Aux contacts
 - Control Voltage
 - Communications – MCS Impact
- Protective relays
- Qualifications – Shock, thermal
- Whole cassette replacement
- Arc exhaust path



Sample Mod-Kit: 3200Amp replacement for 4000Amp Frame)



Side-by-Side view of same kit